

PERSONAL COMPUTING

Canada &
International
\$3.50

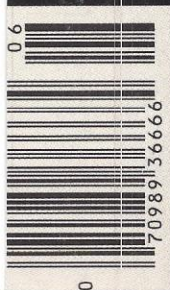
Managing Your Time

**Pert Charting To
Better Project
Management**

**How Computers
Help Kids Learn**

**Professional
Typesetting With
Your Computer**

**Networking
The Computers
In Your Office**



"My Dad bought NEC TREK for all the wrong reasons."



When I told my Dad about NEC TREK, NEC's new personal computer, he wanted one right away. I told him it's a Z80-based system with 16K ROM/16K RAM expandable to 32K ROM/32K RAM.

He said it looks like fun.

I told him it has 10 programmable function keys, high-powered graphics capabilities, powerful Microsoft BASIC included, and an 8-octave programmable musical tone generator.

He said it has lots of 'fun games'.

I told him how its memory storage can interface with cassette, diskette, or cartridge, and how it has a wide variety of sophisticated software available — important things like financial management packages. And how NEC gives him big system power at a small system price,

including options like their thermal printer, disk drive, digitizer touch panel, expansion unit and data recorder. The whole package for under \$2,000, and the computer itself is only \$349.

He just challenged me to a game of Protector.[™]

That's my Dad. I love him, but sometimes I wish he could understand how a kid feels.

NEC

**NEC Home Electronics (U.S.A.), Inc.
Personal Computer Division**

1401 Estes Avenue, Elk Grove Village, IL 60007
Nippon Electric Co., Ltd., Tokyo, Japan



Adventure at your fingertips[™]

CIRCLE 1

*TM Synapse Software



**TURN YOUR PC
INTO AN XT**

NEW PRODUCTS TO GIVE YOUR IBM OR APPLE A MEMORY THE SIZE OF A MOUNTAIN.

Now you can give your IBM PC the clout of an XT—without getting clouted by the price.

Our controller/interface board lets you use MS/DOS 2.0 with a 5, 10, or 20Mbyte 5¼" Winchester disk drive.

Our Mountain IMAGE™ tape back-up system with its tape controller/interface board and 10M tape drive gives you low cost system back-up for the security your business needs.

And look at these low prices:

| | |
|--|------------|
| Winchester controller/interface board... | \$ 450.00 |
| Tape controller/interface board | \$ 295.00 |
| 10M Back-up tape drive | \$1,095.00 |
| 5M Winchester Drives | \$ 995.00 |

And Apple II & III users can expand memory with the Mountain Dynamic Disk System that is software compatible with DOS, CP/M®, and Pascal. Again at a low price.

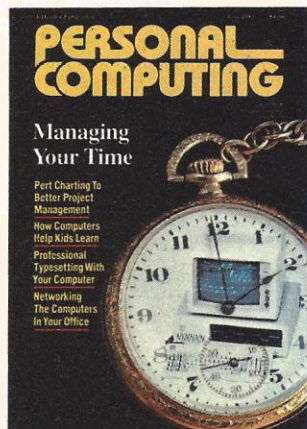
For more information see your Mountain Dealer, or call Stan Scardino, Mountain Computer Inc., 300 El Pueblo Road, Scotts Valley, CA 95066. (408) 438-6650



MOUNTAIN COMPUTER
Incorporated

CIRCLE 2

FEATURES



In business and at home, time is a valuable resource. Time management packages for personal computers can help you make the most of your time and give you freedom for new endeavors.
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COVER PHOTOGRAPHY
GEORGE B. FRY III

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PROFESSIONAL/MANAGERIAL

Time Is Of The Essence

Time management software packages can help executives make better use of their most valuable resource.

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By organizing project data by computer, managers can make sure everything is done on time, on schedule, and within budget.

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DEPARTMENTS

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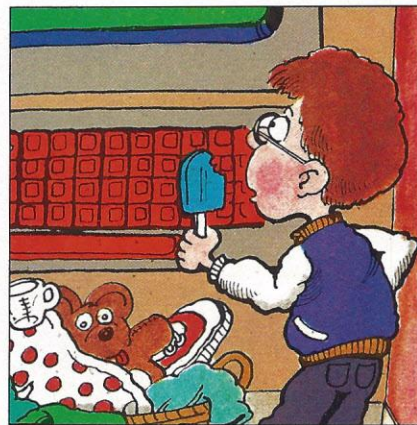
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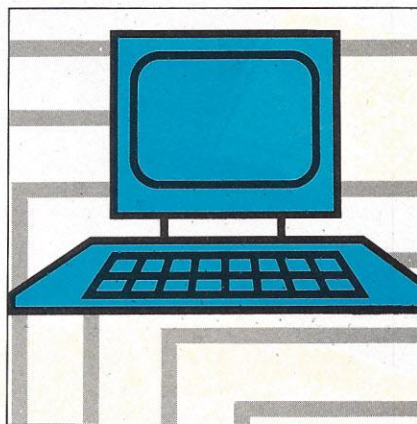
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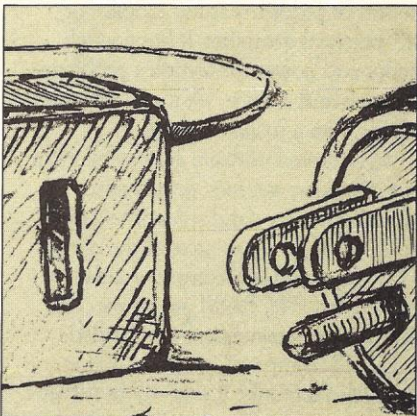
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TI's new Compact Computer. It takes over your work, not your desk.

The ordinary personal computer occupies too much of the ordinary desk.

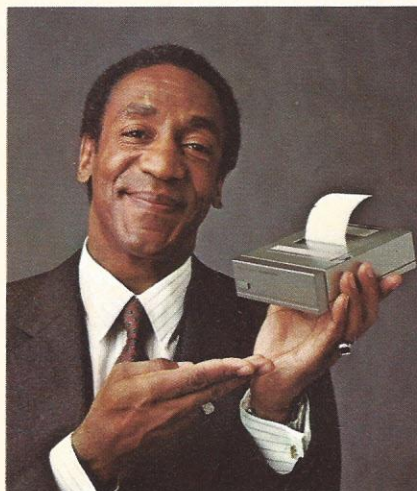
Now Texas Instruments brings you a cordless compact computer that solves the same sort of problems as the Apple™ or IBM™ personal computer. It has enough memory and power for complex problems in business and science, yet the whole thing is smaller than a magazine page.

Sophisticated software is available right now for finance, statistics, production planning, graphics—and spreadsheet and wordprocessing are just around the corner.

For most personal computer tasks, its 6K RAM and 34K ROM are ample. The system is easily, economically expanded.

The TI Compact Computer 40 has peripherals that make it even more useful:

a 4-color printer/plotter; an RS-232 interface for talking with other computers or running a larger printer; and TI Wafertape™ drive for program or data storage. TI Solid State Software™ cartridges offer you a choice of convenient, foolproof programs.



Its built-in language is TI Enhanced BASIC, which allows you to write programs in everyday words. The integrated liquid crystal display shows 31 characters, which can be scrolled to show up to 80 per line. It operates on four AA alkaline batteries that give up to 200 hours of service.

The TI Compact Computer 40 offers solutions anywhere you go. Yet it retails for less than 1/3* the price of Apple™ or IBM™ personal computers. The TI Compact Computer—compact in price and size, but not in power. See it soon at your Texas Instruments retailer.

Creating useful products
and services for you.



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How We Read You

We've been saying for a long time that our readers are a special group of people. To prove our point, we commissioned a national research firm to help us conduct one of the most comprehensive and in-depth studies ever done on a magazine audience. A representative sampling of our subscriber base was asked to complete an extensive questionnaire dealing with their interests and involvement in personal computing.

We'd like to share the results of that survey with you. This way, you can compare your interests with those of other readers.

Our study showed that when you join us as a *Personal Computing* subscriber, the odds are three in four that you do not yet own a system. By the end of the first subscription year, those odds flip over: Three in four of you, by then, have purchased a personal-computing system. What that means to us is that the longer you read *Personal Computing*, the more likely you are to buy a system, and that you've decided *Personal Computing* is the place to go to get the kind of help you need in making that decision.

Most of you bought your personal computers within the last 18 months, and the trend is spiraling upward. Right now, there are five million computers in American offices and homes. By Christmas, that number will have doubled.

The reasons you're buying computers reflect goal-oriented thinking. For example, 43 percent of you bought your system for education or self-development. Forty-one percent bought a personal computer for file management, while another 36 percent of you decided on a system for business accounting. Thirty-four percent of you who now have a system said your primary reason in buying your computer was personal fi-

nancial management. An almost equal number, 33 percent, were primarily interested in planning and analysis, while 39 percent of you said your reason was either household management or entertainment.

On average, you own \$1800 worth of peripherals. You favor the printer—65 percent of you now own one. And, we note with the glee of "we told you so," modems are the fastest-growing category of peripheral in the market. About one in four system owners now owns a modem. You buy an average of six and a half software packages a year—and the point of purchase for your software is in places other than where you bought your system. *Personal Computing* readers plan to spend an average \$500 on software within the next 12 months.

One of the most interesting things our study told us was that a full 40 percent of you who now own systems are going to buy a second computer within the next year. And readers who are planning this second, or in some cases, third purchase, intend to buy more expensive systems.

So important did we find this tendency on your part to return to the well for a second or third machine, that we assigned Michael Rogers to cover the phenomenon. His report will be featured in our July issue.

To all of you who contributed your time and energy to helping us understand how we can serve you better, we want to extend our thanks. *Personal Computing* is fortunate in having an audience of readers who care, and who, judging by the response to our questionnaire, are determined to help us continue to serve in important and timely ways.



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What's on the best-seller list in IBM Personal Computer software?

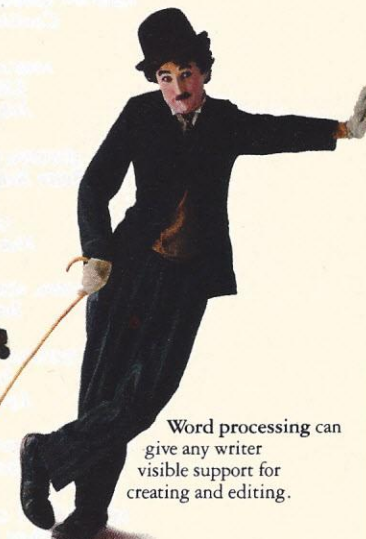
Games can make anyone
a winner while treating
you to hours of fun
and fantasy.



Payroll can boost your productivity and make employee deductions less taxing.



Electronic spreadsheets help
build financial models that
can shape your future.



Word processing can give any writer visible support for creating and editing.

WHILE KID PUSHERS
COMPUTER CAME TOWARD
MORE MODERN TIMES

Inventory control can help put you on top by keeping track of what's what and where.



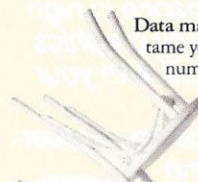
Languages like BASIC can encourage students to write programs of their own.



Stock monitoring can help put you in the chips by tapping the world of Wall Street.



Data management can help tame your file of names, numbers, facts and figures.



Accounting can give you a leg up when balancing the books.



People prefer IBM Personal Computer software for a variety of reasons. And one of the best reasons is its variety.

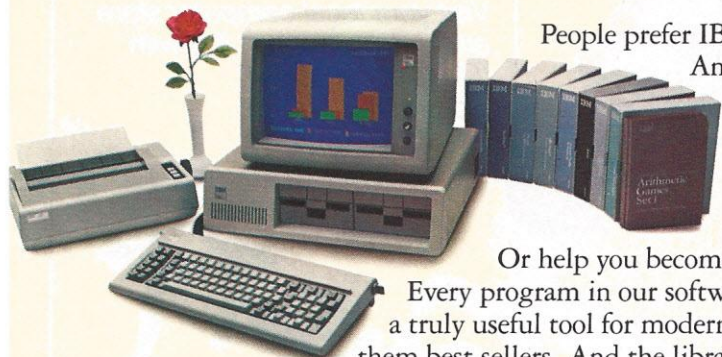
Because, for just about anything you want the IBM Personal Computer to help you do, there's software to help you do it. Software to help improve productivity, efficiency and planning. To help teachers teach and students learn.

Or help you become an even more astute gamer.

Every program in our software library makes the IBM Personal Computer a truly useful tool for modern times. That's why a lot of buyers like you have made them best sellers. And the library is still growing.

So the best may well be yet to come.

IBM®



For more information on where to buy IBM Personal Computer software and hardware, call 800-447-4700. In Alaska or Hawaii, 800-447-0890.

WHIZ KID PUSHES COMPUTER GIANT TOWARD MORE MODERN TIMES.

\$795. Plotter Has 'Charlie' Back In Pictures.

The new Sweet-P™ Personal Plotter™, invented by Whiz Kid Richard Murray, delivers a command performance in high resolution, hard copy graphics when sharing the bill with your IBM® PC.

With a \$795 price tag—Sweet-Plot™ I Software and interface hardware included—somehow Sweet-P's performance seems even sweeter. And when you're ready to take your show on the road, Sweet-P

slips neatly into a slimline briefcase.

**Sweet-P
Graphics-
to-Go.**

Every graphic you'll ever need for business, finance, engineering and science can now be produced quickly and easily. Sweet-P draws colorful pie charts, bar graphs, line graphs, illustrations and alphanumeric labeling. On any paper up to 10 feet long.

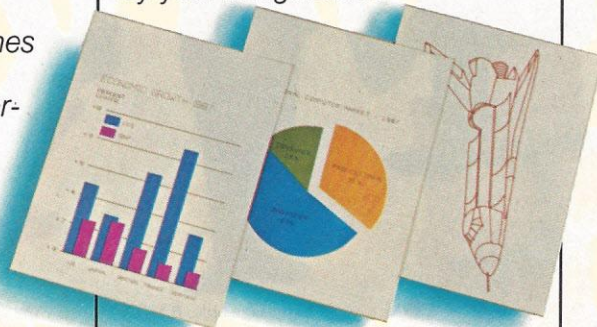
On overhead transparency material. At amazing speeds of up to 6 inches per second.

With the Sweet-P Personal Plotter, you're not only able to draw your own conclusions, but communicate them more effectively as well.

Sweet-P Software Makes It Easy.

Getting into pictures is easy with Sweet-Plot™ I

Software. It will have you drawing standard graph formats in minutes—even if you're not familiar with how a plotter works. And for drawing complex business graphics, there's Sweet-Plot™ II Software by BPS®—limited only by your imagination.



So, when you want your IBM PC to become even more modern for the times, plug into the Sweet-P Personal Plotter. Visit your local computer store and see how sweet it is with 'Charlie' back in pictures.



\$795
SOFTWARE
INCLUDED

Modern Art for
IBM forecast by
Richard Murray,
Enter Computer's
Whiz Kid Chairman.

Sweet-P™

Enter Computer, Inc.
6867 Nancy Ridge Drive
San Diego, CA 92121
Tel: 619-450-0601

CIRCLE 4



Plug your OsborneTM into the telephone. Say hello to the information age.

Say hello to electronic mail, because now you can send files and information electronically—literally over the telephone lines—from your Osborne Personal Business Computer to other Osborne computers, to electronic bulletin boards, and even to other computers.

(Why wait for overnight delivery when you can send a twenty-page document around the world in three minutes?)

And say hello to more information, too, because now you can easily connect to a variety of information networks. Like THE SOURCETM America's Information Utility. (A subscription offer is included with the COMM-PACTM communications option.) Or like the DOW JONES News/Retrieval Service[®]—your direct connection to Wall Street.

The Osborne Personal Business Computer is the most cost-effective personal productivity investment for the individual who works

with words, numbers, and information.

And only \$265 more buys the COMM-PAC modem/communications option for the



Osborne system. Now your Osborne can talk to the world.

You'll find the world has a lot to say. For the name of your nearest Osborne dealer, dial (800) 772-3545 ext. 905 (in California); (800) 227-1617 ext. 905 (outside California)

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COMPUTER CORPORATIONTM

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CIRCLE 6

Compute While You the Buffer that

MICROFAZER PUTS YOU BACK TO WORK

Your computer helps you work fast. Unless the printer is running. Then it doesn't help you work at all. It won't let you enter data or process information. It simply won't compute.

That's where Microfazer by Quadram comes in. It's the print buffer that frees your computer. And lets you keep right on working.

THE BUFFER THAT REMEMBERS IT ALL

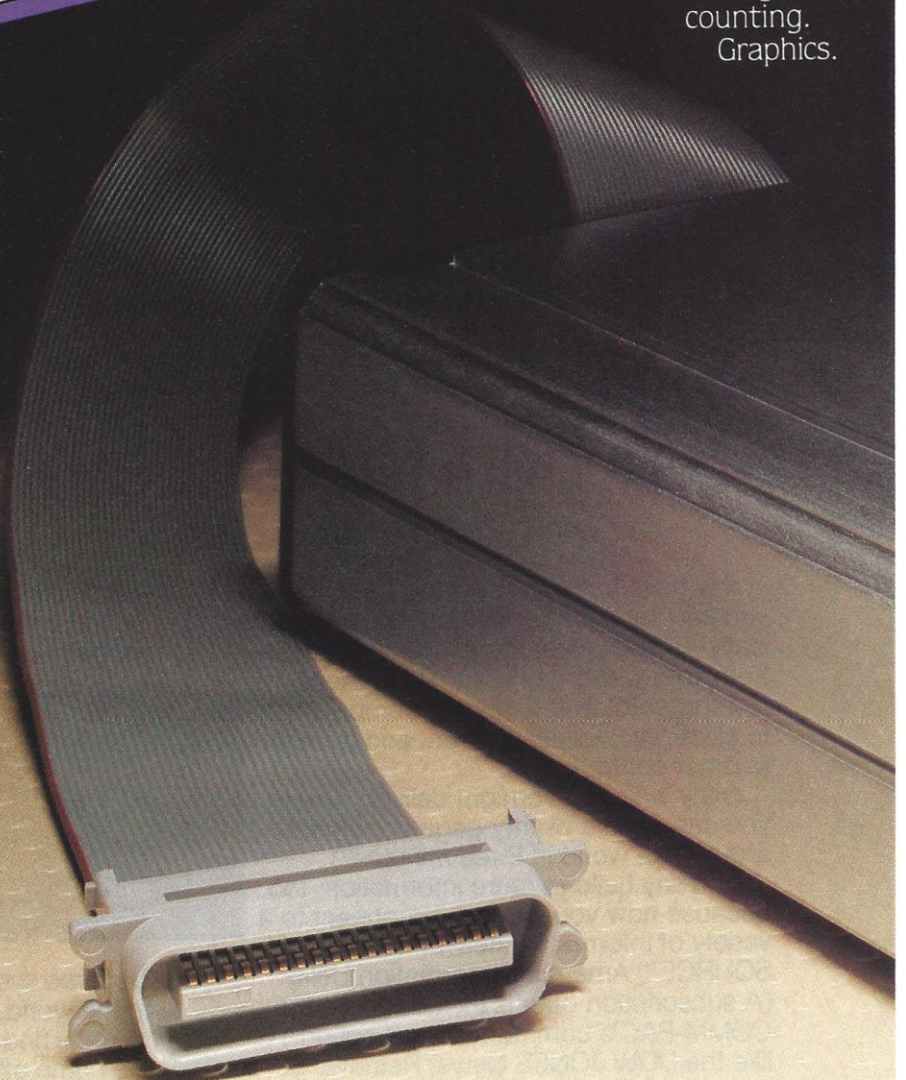
Microfazer stores data from your computer in its own memory, then sends it to the printer at the proper rate.

You don't have to worry about losing vital information be-

cause of limited buffer space. Because Microfazer starts with 8K of memory and is expandable to 512K—a full half-megabyte. So it can keep pace with your needs. Now, and in the future.

THE ANY COMPUTER, ANY PRINTER BUFFER

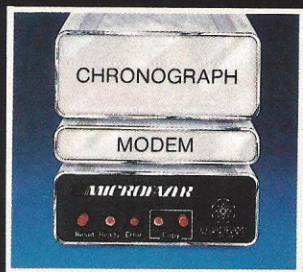
Microfazer is perfect for any buffer task. Word Processing. Accounting. Graphics.



Available at retail stores worldwide.

Print with Microfazer,™ Remembers It All.

You name it. And it's perfect with any enhancement. Printers. Plotters. Even modems.



You'll find Microfazer in a variety of models and sizes. Some stand alone while others are stackable. There's one that

snaps onto the back of the popular MX Series Epson printers. And another that plugs inside an Epson MX or FX.

There's a Microfazer to interface incompatible devices. And for any data transmission need. Serial or parallel.

QUADRAM REMEMBERS TOO

Whatever your system, Quadram has a buffer to handle it. Including Microfazer's counterpart: Interfazer, for buffering and controlling up to eight computers with one or two printers.

Quadram didn't forget the hardware features either. The Ready LED, manual Reset and Pause/Copy buttons are all part of the

Quadram Quality tradition.

A PRICE YOU'LL GO FOR

You'll be glad to know that you can get Microfazer backed by Quadram Quality at a price that won't stop you from owning one. Parallel to parallel versions start at \$159 (8K). Serial to parallel, parallel to serial and serial to serial versions start at \$199.



**MICROFAZER.
THE PRINT BUFFER
THAT REMEMBERS IT ALL.**



QUADRAM
CORPORATION
An Intelligent Systems Company



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CRYSTAL UNIFORMITY
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IMPROVED JACKET
INTENSIFIED CALENDERING

THE GOLD STANDARD

**You can wait for industry standards
to mandate improved performance.
Or you can have it now on Maxell.
The Gold Standard.**

The refinements of The Gold Standard, from oxide particles to lubricant to jacket, are uniquely Maxell. And therefore, so are the benefits.

Our unique, uniform crystals assure dense oxide packing. So you begin with an original signal of extraordinary fidelity. A signal we safeguard in ways that leave industry standards in our wake.

An advanced binder bonds oxides to the base material preventing time and money-wasting dropouts. Calendering then smooths the surface for a read/write signal that stays

clear and accurate. And lubricants reduce friction between head and disk for a longer media and head life. To house it, we then

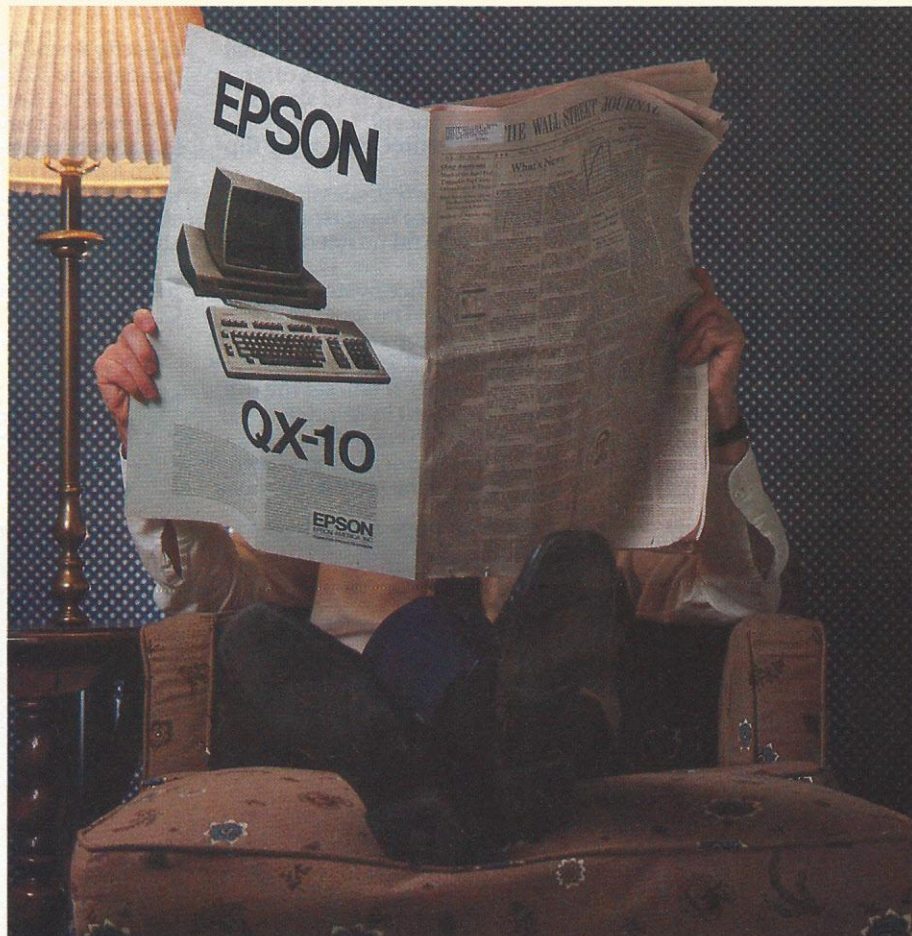
constructed a new jacket heat-resistant to 140° F to withstand drive heat without warp or wear. And created the floppy disk that leads the industry in error-free performance and durability.

All industry standards exist to assure reliable performance. The Gold Standard expresses a higher aim: perfection.



maxell
IT'S WORTH IT.

Computer Products Division, Maxell Corporation of America, 60 Oxford Drive, Moonachie, N.J. 07074 201-440-8020



The QX-10.
No ad can do it justice.

Epson.

There's an awful lot of computer hype these days. And we think it's time for a little old-fashioned honesty.

So we're going to give you a few solid reasons why — even if you look at nothing else — you should go to your dealer and take a close look at the new Epson QX-10.

Anybody can use it.

What makes the QX-10 the most remarkably usable computer to date is a unique software system called VALDOCS, coupled with a new keyboard design called HASCI. VALDOCS reduces the time it takes to master the QX-10 from hours to minutes by displaying exactly what your options are, while the straightforward, detachable HASCI keyboard places all the most-used functions right in front of you, grouped logically and labeled in plain English.

You may never buy software again.

VALDOCS may be all the software you'll ever need. Right out of the box it's a sophisticated *word processor*; an *information indexer* for easy access to files; an *electronic mail system*; a *calcu-*

tor; an *appointment book and notepad*; and a *high resolution business graph drawing system*.

A little price tag.

Mere words are not enough. To fully appreciate the powers of this machine, you must experience it for yourself. So visit your dealer and see what it can do. And if that doesn't sell you, the comfortable price tag will. It sells for under \$3000. And that's no hype.



EPSON
EPSON AMERICA, INC.
COMPUTER PRODUCTS DIVISION

Call (800) 421-5426 for the Epson dealer in your area.

CIRCLE 11

Presenting the computer America is flipping over.

Some computers have a vertical format for word processing. Still others offer a horizontal format for spread sheets.

The Corvus Concept™ gives you both. All in a single unit. By simply flipping the screen.

Whole-page word processing and 13-column one-glance forecasting. No need for scrolling. And no need to resort to a printer.

The Seybold Office Systems Report (June 1982) called it "The most impressive new desk-top computer" at the 1982 Hannover Fair. Byte Magazine (June 1982) said "It will set the price/performance standard in its price class for some time to come."

Besides its dual orientation screen, the Concept has set the pace in memory

capacity with 256 thousand bytes (expandable to 512 kilobytes).

And it's designed to grow with your needs. Every Concept has a built-in network interface that transforms it from a powerful stand-alone computer to a versatile, multi-function workstation on an interactive peripheral-sharing network.

Because it was an idea whose time had come, we called it the Corvus Concept.

You'll call it a miracle.

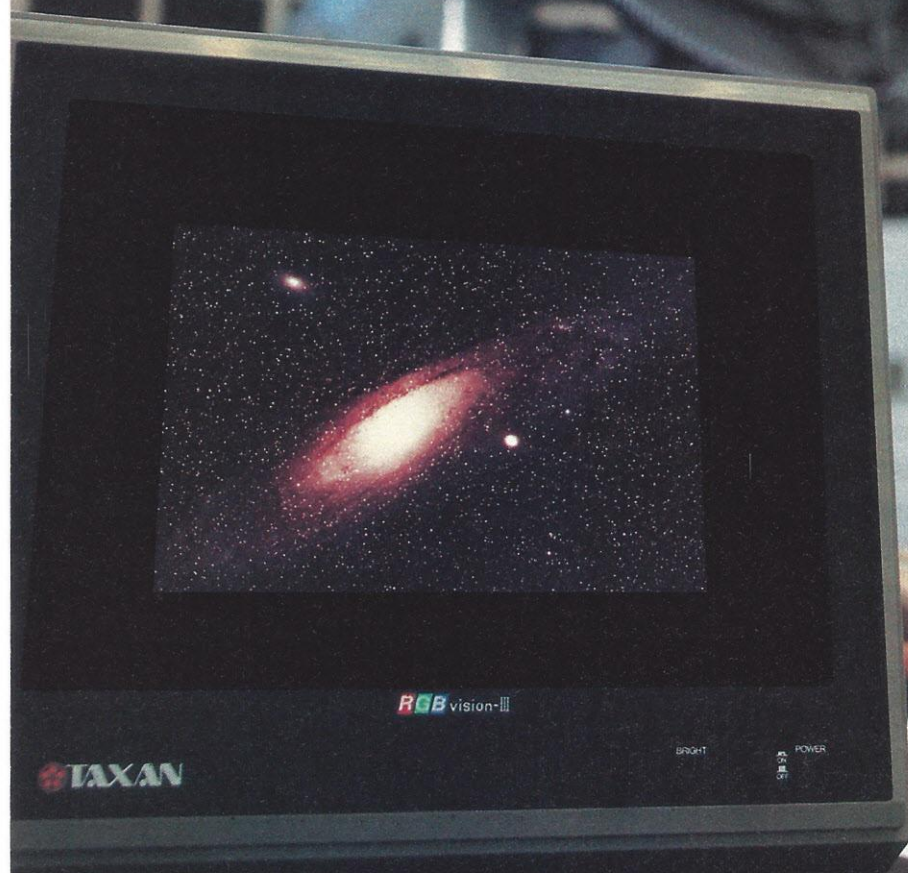
★★ CORVUS SYSTEMS

2029 O'Toole Avenue, San Jose, CA 95131
800/551-5115 TWX: 910-338-0226 Telex: 278976



Taxan monitors when precision counts

Dedicated to quality and precision, TAXAN offers a complete line of monitors including green and amber, ultra-high resolution monochrome, plus medium and high resolution RGB monitors.



⊗ **TAXAN** also offers the 410-80, 80 column and RGB card to interface with the Apple IIe.

⊗ **TAXAN** monitors stand alone.

See your local ⊗ **TAXAN** dealer, or call us for details!



TSK Electronics Corporation
18005 Cortney Court
City of Industry, CA 91748
(213) 810-1291

CIRCLE 10



Reliable.

You can count on 3M diskettes. Day after day.

Just like the sun, you can rely on 3M diskettes every day. At 3M, reliability is built into every diskette. We've been in the computer media business for over 30 years. And we've never settled in. We're constantly improving and perfecting our product line, from computer tape and data cartridges to floppy disks.

3M diskettes are made at 3M. That way, we have complete control over the entire manufacturing process. And you can have complete confidence in the reliability of every 3M diskette you buy.

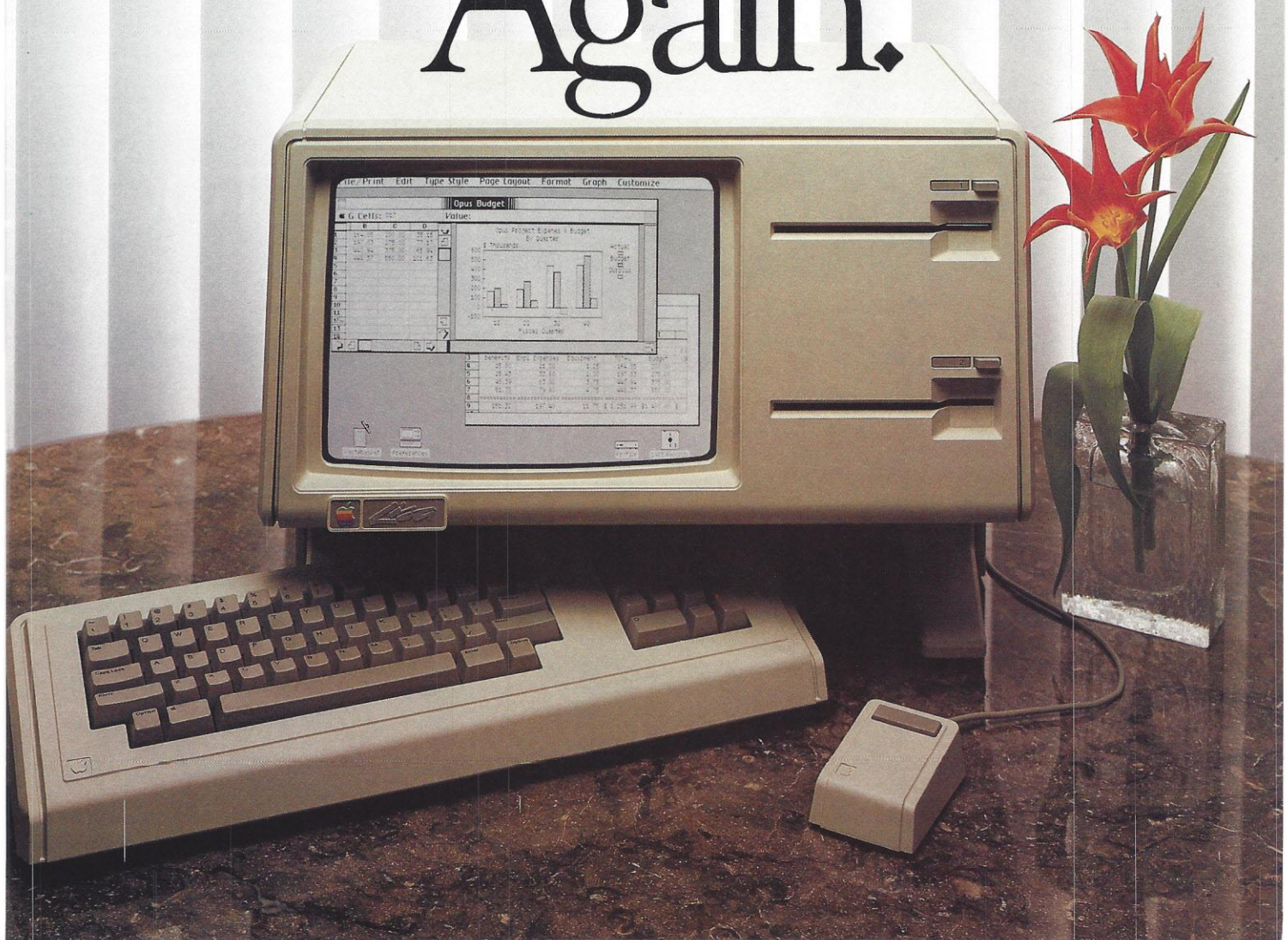
Look in the Yellow Pages under Computer Supplies and Parts for the 3M distributor nearest you. In Canada, write 3M Canada, Inc., London, Ontario. If it's worth remembering, it's worth 3M diskettes.

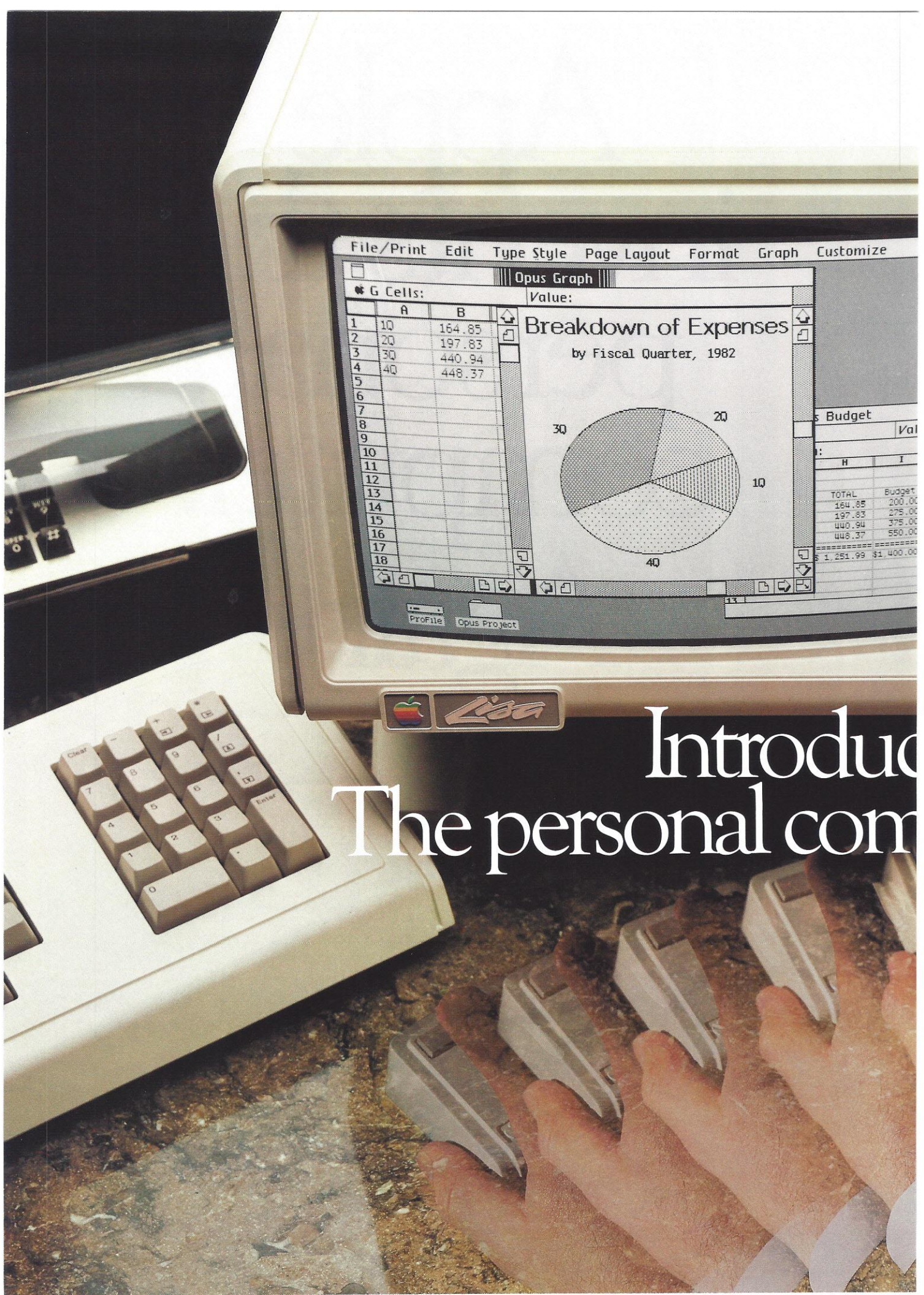


3M hears you...

3M

Apple invents the personal computer. Again.





Introduce
The personal computer



ing Lisa. puter for the office.

The personal computer revolution began with easy-to-use computers and ready-to-use programs that made it possible for just about anyone to master personal computing in 20-40 hours.

Still, that's more time than many people can afford. Especially people who need personal computers most — executives, managers and small business owners.

But now there's Lisa™ by Apple.

Its hardware alone makes it the most powerful personal computer available:

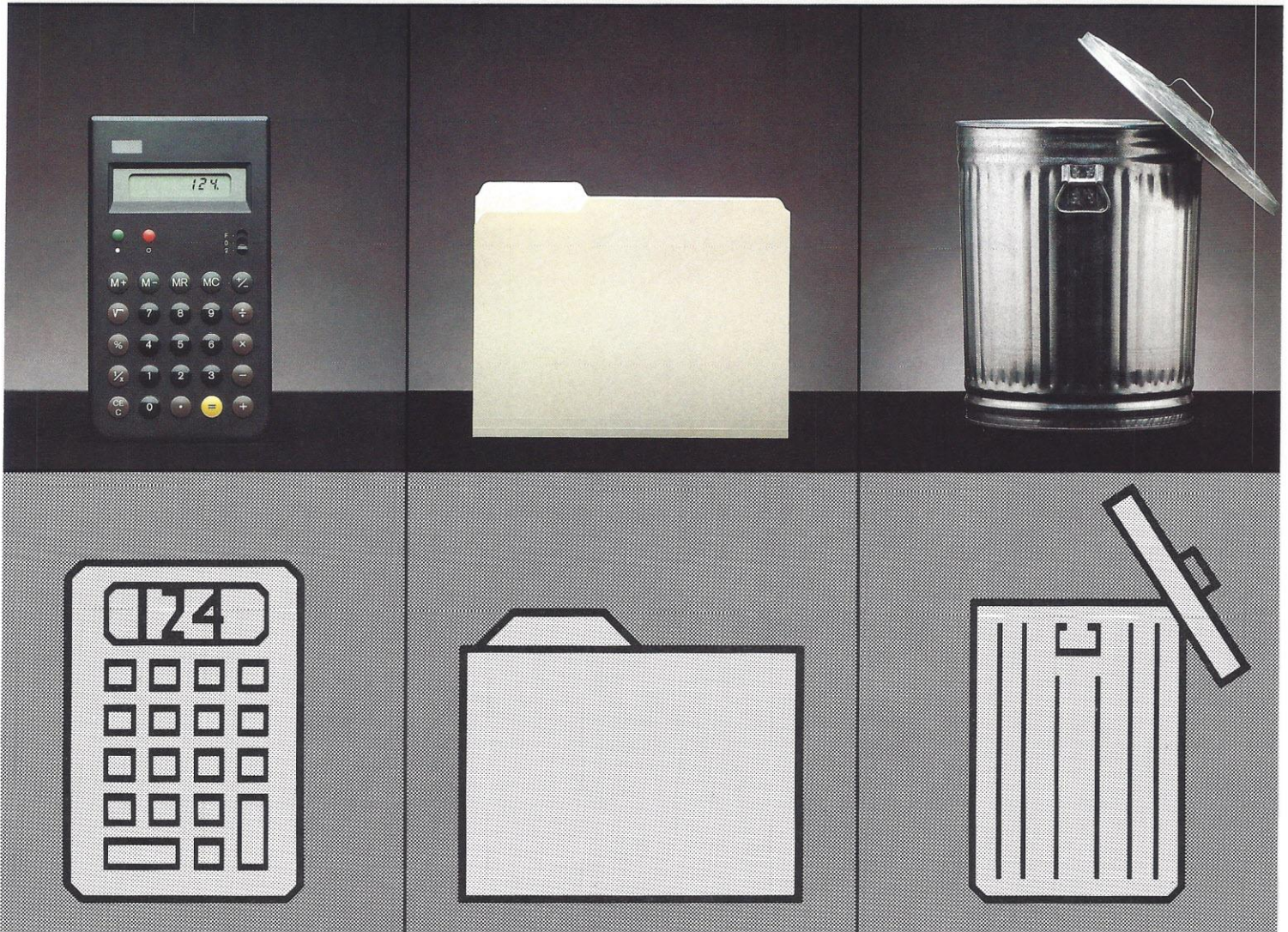
32/16-bit MC68000 micro-processor. 364 x 720 bit-map display. 1-Megabyte of internal memory. Dual 860-K disk drives plus a 5-Megabyte ProFile™ hard disk.

But the real story is the way Lisa puts all that power in your hands:

It's the first personal computer that's as easy to understand as your desktop.

Because that's precisely the way Lisa works.

So advanced, you already



To use a conventional personal computer, you first have to program yourself by studying the manual and learning a complex set of computer commands that vary widely from program to program.

Lisa replaces those commands with familiar pictures that work the same way from program to program. Files look like file folders. There's a

calculator, stationery, even a wastebasket. So you can work with Lisa the same familiar way you work at your desk.

To tell Lisa what to do, all you have to do is point to the appropriate picture using a clever palm-sized device called a "mouse." As you move the mouse on your desk, the pointer moves on Lisa's screen.

Lisa's extraordinarily powerful software takes care of all the details. So you can work with the system intuitively, right from

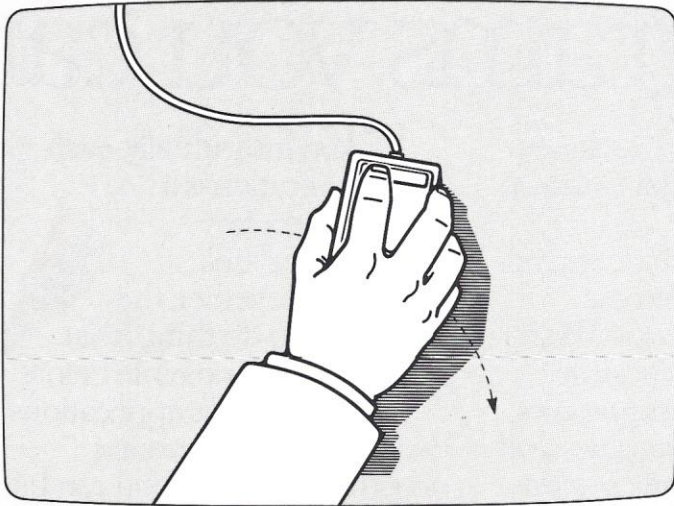
the start.

You can shape any kind of information you need — graphs, numbers, words, even pictures — and see it all side-by-side.

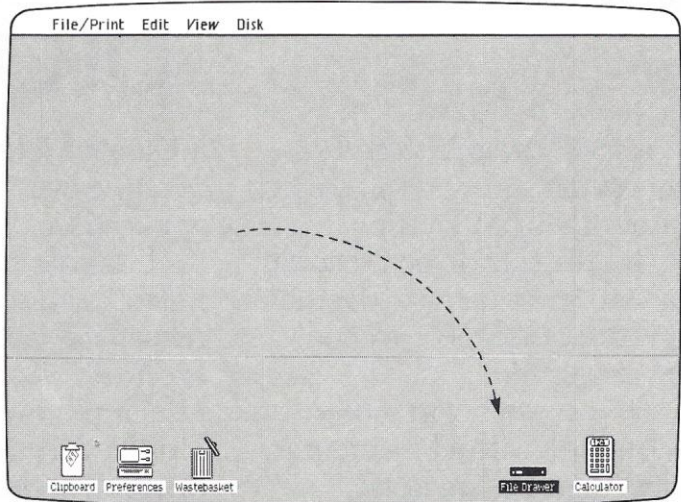
And you can transform that information in ways simply not possible with any other personal computer.

You concentrate your effort on what you want done — not on how to get the computer to do it.

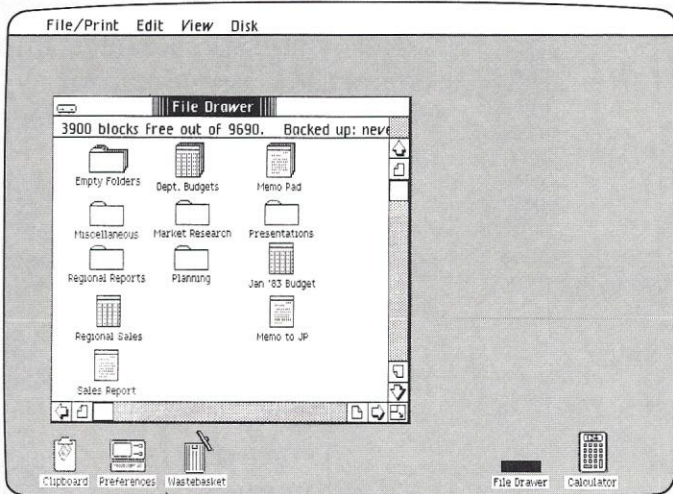
ady know how to use it.



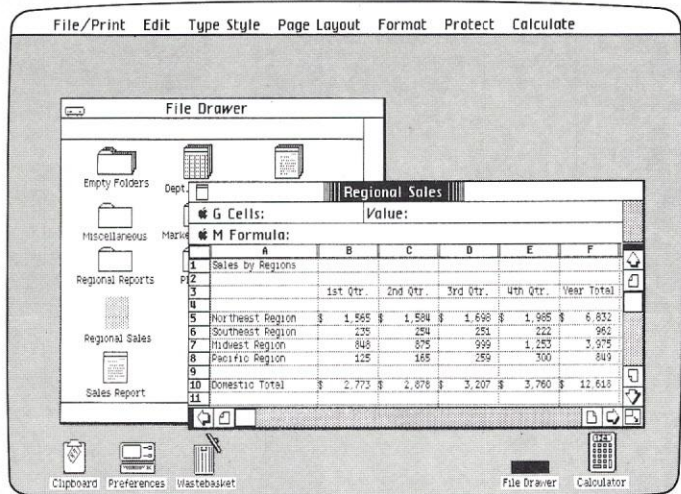
To tell Lisa what to do, all you have to do is point. You control the pointer on Lisa's screen by moving the "mouse" on your desktop.



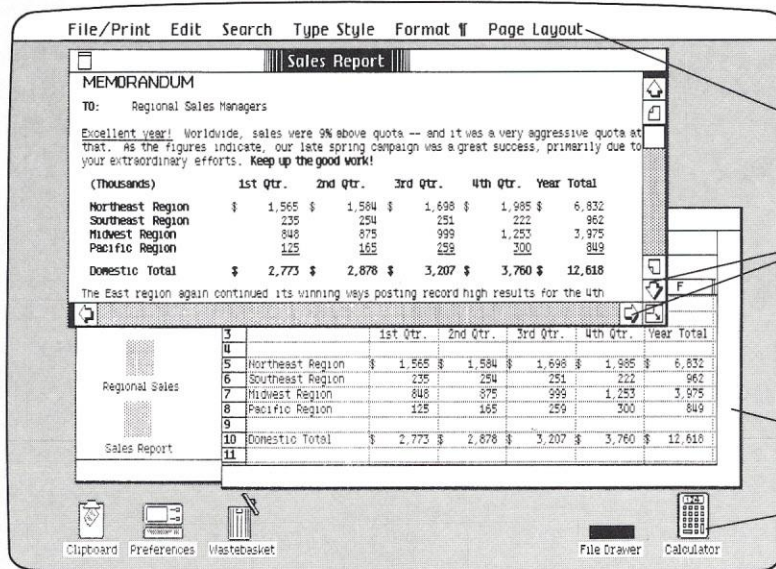
To open a Lisa "file drawer," you simply point to it by moving the mouse.



The "file drawer" opens and shows you all the documents inside. Now you can select one or more to work with.



You can stack documents as you would on your desk. Each becomes a "window" that lets you scan over a huge workspace.



All Lisa functions are selected with the pointer from pull-down menus in the Menu Bar, so you don't have to search through a manual.

By pointing to the arrows, you can scan left or right, up or down.

More than one document can be on the screen at once. In most cases, you can "cut" information from one and "paste" it into another.

Familiar symbols simulate the way you work at your desk.

It took 200 years programs you can

Lisa's software represents over 200 person-years of research, development and testing.

But the sole objective of all that effort was to make the most powerful office tools immediately accessible.

So you can begin producing useful work with a Lisa program in less than half an hour.

Lisa is available with six

integrated software packages covering every major business application:

LisaCalc electronic spreadsheet, LisaList electronic personal database, LisaWrite executive word processing, LisaGraph business graphics, LisaDraw design graphics and LisaProject electronic project management.

Taken individually, each Lisa application is a powerful professional office tool.

Taken together, they allow you to do things that simply weren't possible before.

Because Lisa's applications work harder by working together—information can be "cut" from one and "pasted" directly into another. So you can effortlessly turn figures into graphs, paste spreadsheets into a report, and print it all out while you move on to another task.

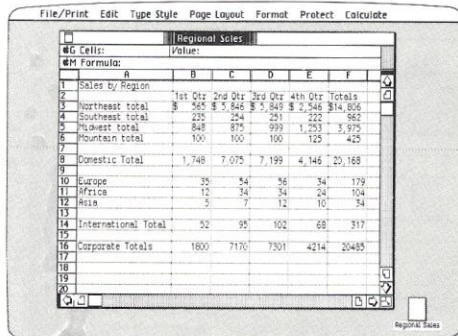
In the near future, with Lisa's designed-in networking capabilities, you'll be able to create a powerful network of Lisa workstations that can grow from one department to your whole organization.

And you'll also be able to communicate with other computers with Lisa terminal applications, so you can access valuable commercial data libraries like Dow Jones News and Quotes™ or The Source™, or link with your company's own mainframe computers.

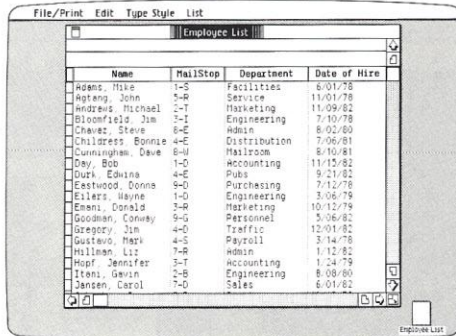
Of course, the only way to appreciate everything Lisa can bring to your office is to experience Lisa for yourself.

So give an Apple Personal Office Systems Dealer half an hour of your time.

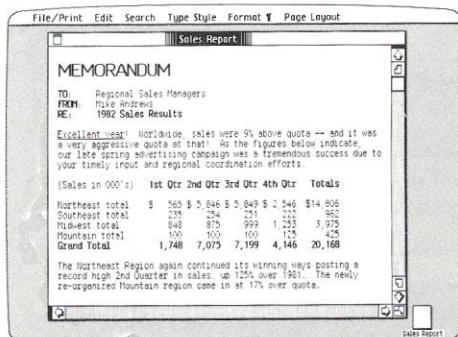
And he'll give you 200 years of ours.



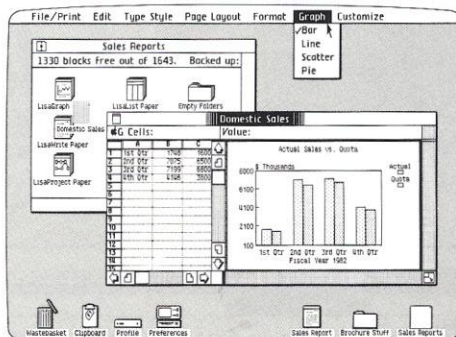
LisaCalc



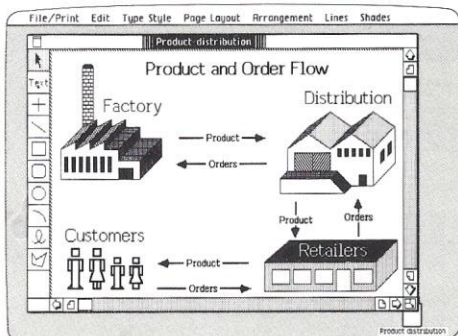
LisaList



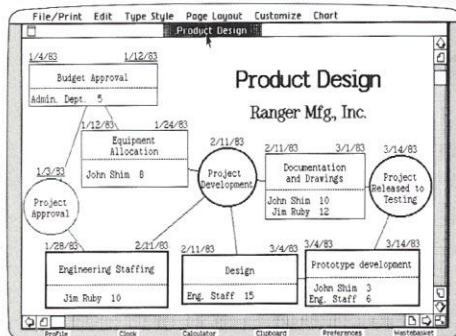
LisaWrite



LisaGraph



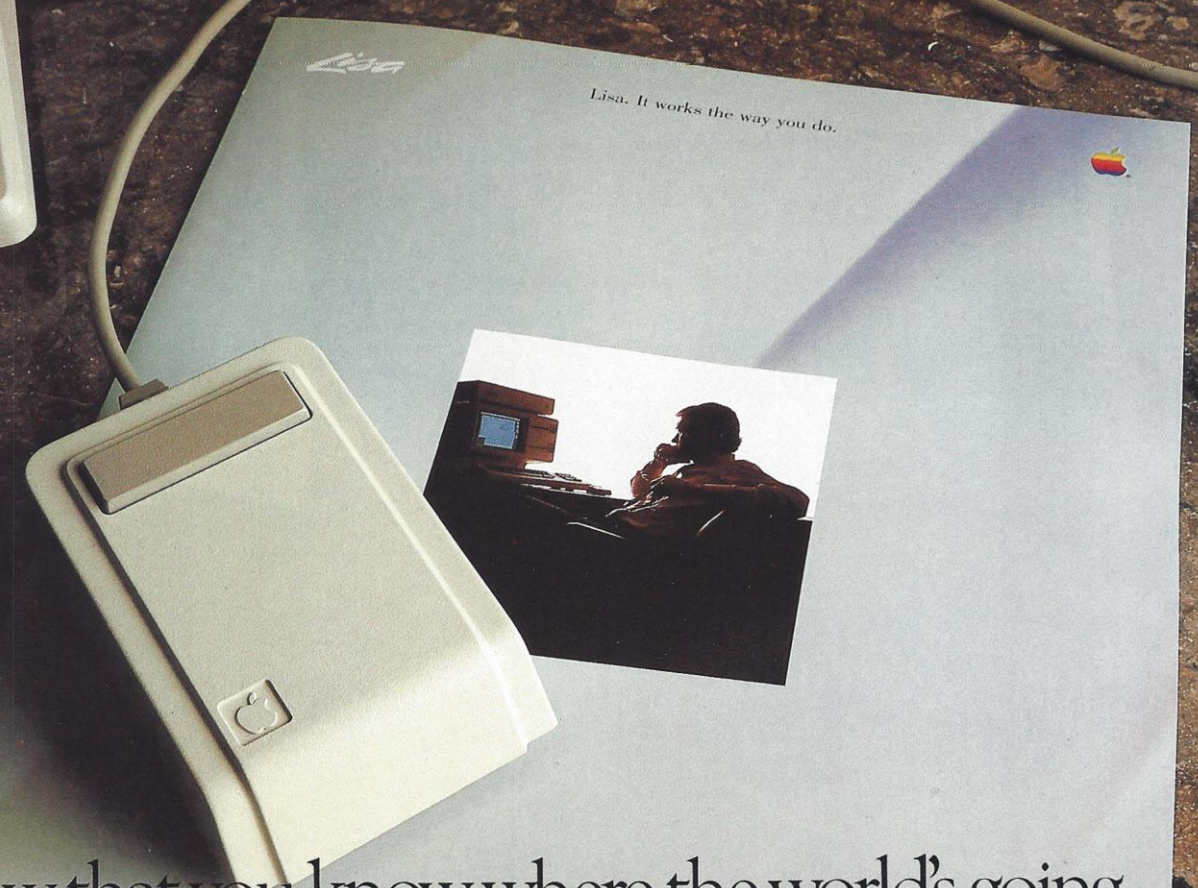
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The Pros And Cons Of The Commodore 64

In this monthly column "Answers" we will respond to your most frequently asked general questions about personal computing. Please send your questions to: *Answers*, Personal Computing, 50 Essex St., Rochelle Park, NJ 07662.

Q. The Commodore 64 has received a lot of comment, partly because of its low price. Is there enough software available for the 64? What are the pros and cons of this machine?

A. By the time you read this, the Commodore 64 should have enough software for full utility.

Software development for the 64 has been slow for several reasons, the main one being that the 64's disk drive has only recently become widely available, and productivity software is usually done on disk rather than cartridge, because of the need for periodic updates and, often, too low a volume to justify the expense of tooling up to do a cartridge. But according to Michael Humphries, marketing manager for HES, a Burlingame, California-based software firm with an emphasis on Commodore software, the tip of the 64-software iceberg was revealed at the March West Coast Computer Faire. Humphries says he saw 64 software of every description at the Faire, coming from firms like Broderbund, Micro Lab, Datasoft—and of course HES, which should have a word processor, a spreadsheet program, a graphics package, and educational software on the market soon. Commodore is coming out with its own software too—Word Machine (a word processor), Name Machine (mailing list), EZScript (an ad-

vanced word processor), EZFile, EZCalc, and several games.

As for the pros and cons of the Commodore 64, here's the way we see it. At present, the 64's strong points are good 40-column-wide display with upper- and lowercase, including true descenders; 64k RAM—much larger than most other low-cost computers; polyphonic sound synthesis; 320 by 200-dot graphic resolution; moving-figure graphics (called Sprites), which can move over and under each other; whole-screen scrolling; four programmable function keys; full-travel keyboard; and the ability to add peripherals without having to buy a chassis.

On the negative side, the closed-box design doesn't allow for much memory expansion or heat conduction. Style-conscious folks will fault the 64 in comparison with sleeker machines. The idea of the 64 is value.

Q. I own a Hazeltine Esprit terminal which I use to access the North Dakota State University computing center. I'm interested in the Osborne computer, but I don't like the small screen. Can I hook up my Esprit to the computer through the RS-232 or modem port and use the Esprit's keyboard, software, and screen?

A. Probably. It's fairly simple to hook a terminal into most serial ports. The trouble is that serial ports commonly run at 1200 baud—the fastest speed modems currently used with personal computers. Terminals communicate with the computer's CPU (Central Processing Unit) at 9600 baud. At 1200 baud you'd find the screen response awfully slow. But there are solutions.

We took this question to Brad

Baldwin, technical editor of Osborne's house publication, *The Portable Companion*. Baldwin had just installed something called the Osbaud in his Osborne. Advent Corp. of Orange, Calif., makes this \$60 device to solve problems just like yours. Baldwin installed the Osbaud, hooked up a Televideo 920 terminal, and got 9600-baud data transfer between computer and terminal, full 80-column display on the screen, and the use of the Televideo keyboard. It should work equally well for the Hazeltine.

Installing the Osbaud wasn't simple, however. Baldwin had to open up his Osborne, read the schematic diagram that came with the Osbaud, cut a trace on the Osborne's motherboard, and solder four pins. The result was a little PC board piggy-backed to the motherboard. Baldwin plugged in his terminal, booted his CP/M operating system software, and typed STAT CON:=CRT to link the two machines. Then he configured the terminal to the Osborne's requirements: 1 start bit, 1 stop bit, 8-bit word, no parity, 9600 baud. These are just communications protocols.

There's one other serious consideration: installing the Osbaud invalidates your warranty. Baldwin mentioned another device, whose maker claims to achieve the same results as Osbaud with an external device that doesn't invalidate the warranty. Baldwin hadn't tested it yet, but it might be worth contacting T&W Corp. of San Diego for details. T&W claims its device plugs into the Osborne's IEEE-488 parallel port and converts it to a serial port, which can then be configured for any baud rate from 110 to 9600 baud. By com-

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parison, the Osbaud can run from 50 to 19,200 baud.

Baldwin mentioned a third way to link your Hazeltine with an Osborne. On page 22 of the *Osborne Technical Manual* there's a description of how to change the baud rate of the Osborne's serial port in hardware. But unlike the Osbaud or the T&W device, this modification fixes you at the baud rate of your choice. You'd have to go back into the machine with your soldering iron if you wanted to change the baud rate at a later date.

Q. I want to get a modem for my office and my home so I can telecommute several days a week. But I seem to have a problem in both places. My office has a PBX system, and all the modems I see in the stores seem to need the ordinary home jack to connect. Do I need to have a separate line installed? Also, my computer at home is a long way from the telephone wall jack, and it would be very inconvenient to move the computer nearer to the jack. Do I need to pay for having a separate line there, too? Finally, I have "call waiting" on my home line. Will that interfere with the modem?

A. We checked with our local telephone company which recommended you check with your telephone business office to find out what you can and can't do. They'll need to know your telephone number(s) and the kind of PBX installed in the office. The manufacturer of the modem might have special requirements, too, which might swing the decision to one brand or another. Finally, federal and state regulations could mandate one kind of modem over another.

Having said that, we can also say the solution might not be as complicated as it sounds. In some cases, our phone company said, a connection block can be wired onto one of the lines coming from the PBX, and you can connect the modem that way. In other cases, depending on the instal-

lation, it can't be done. If the PBX isn't from your telephone company, of course, then the private vendor will have to be called in on this problem.

If you don't want to go through all that, you could try buying a modem that connects to the handset connection on your telephone, rather than the more common wall-connect type. One popular modem of this type is the Anchor Signalman Mk. I modem, from Anchor Automation, Inc., 6624 Valjean Ave., Van Nuys, Calif. 91406, (213) 997-6493. The Signalman comes with a standard RS-232 serial cable and plug connected to it, so the modem will work with almost any computer. It's shaped to sit under your telephone desk set. In the office, just set the Signalman beside your PBX phone and plug it into the handset. One *Personal Computing* editor has a Signalman and has used it in both home and office, and reports that it works fine.

In your home, you can get parallel-connection blocks for your telephone with modular connectors so you can plug your modem into the same line to which your phone is connected. Or you could use a modem that plugs into the handset connection here, too. Again, just plug the modem into the handset connection and you're in business. You can get an extension cord from Radio Shack so your home phone can go beside your computer, wherever it is. You could use acoustic-connect modems to solve your problem, but once you've tried the direct-connect type you'll probably prefer it. The one advantage acoustic modems have over direct-connect is the ability to dial numbers through your phone instead of your computer. While this may seem more cumbersome, it lets you know right away if the number you called is busy or not answering. With a direct-connect modem you have to wait to see if you get a connection. If you don't, most modems can't tell you why. In answer to your question, unfortunately every time your phone clicks to show you a

call is waiting, it may blow your modem connection right out of the water. So you might have to get rid of "call waiting" if you want reliable telecomputing.

Q. I own a VIC-20, but I'm very impressed with the Commodore 64. Do all VIC accessories, like the Superexpander, work on the 64? If not, is there an inexpensive way to upgrade the VIC-20 so it's as good as the 64 (memory, graphics, sound, 40-column screen, etc.)? If so, are there any good places to sell a slightly used VIC?

A. The VIC-20 can be expanded with various bits and pieces, but the machine's ultimate capabilities still fall short of the Commodore 64's power, and the total package may also cost more than a 64. For instance, the VIC-20's on-board memory can only be expanded to 32k of RAM while the 64 comes with 64k. It is possible to add more memory to the VIC-20, but the additional memory must be addressed by a technique called bank switching. Most VIC-20 software doesn't use bank switching, because of the limited number of VIC-20s out there with more than 32k RAM. If you still want to go that way, contact Data20 Corporation in Laguna Hills, Calif. This firm makes RAM expansion for the VIC-20, as well as a wide variety of other expansion hardware and software for the low-priced Commodore computers.

As far as switching over accessories from your VIC-20 to a 64: Most will work on a 64, but some are redundant—like the Superexpander. But frankly, it sounds as though you'd be happiest getting a Commodore 64 and selling your VIC. The 64 can also be expanded, and you'll get yourself a lot more "headroom." You can use the normal outlets—classified ads, flea markets (some places in the country even have computer equipment flea markets). Or

you might think of donating it to a local school and getting the tax credit—not to mention making a bunch of kids very happy!

Q. Can I make my Apple II Plus shift keys work like typewriter shift keys instead of only getting the shift function to work on keys with two different symbols?

A. You can do the shift-key modification in one of several ways, costing from \$2 to over \$30, and all accomplishing the same thing. You need software that recognizes the shift-key modification, but any good Apple word-processing program will recognize it, and so will other types as well.

To modify the shift key, first you need about 18 inches of wire with microclips attached to each end. Microclips encase a little metal hook in a spring-loaded plastic sheath, so that when they're hooked onto a wire or leg of an IC the clip grips the wire tightly and the plastic shroud insulates the metal hook from other wires.

Radio Shack sells all the pieces, but you have to solder them together. An electronic parts store will probably have such a clip prewired, and sell it for less than a computer store will. The computer store will tell you where to connect the wire, though. Many hardware and software products for the Apple II Plus also include instructions on attaching the clips.

To make the modification, unplug your Apple II Plus and lift off the lid. Lean over your keyboard and look down. You'll see the motherboard on the bottom of the computer. Lean further and you'll see a second PC board on the underside of the keyboard, hanging a few inches above the motherboard. The left side of this board has the switch which lets you choose whether the RESET key is directly enabled or requires pressing CTRL and RESET together to make the computer reset. The right side holds a row of 25 metal pins con-

necting two brick-colored rows of plastic, below the words printed on the circuit board: "ENCODER BD. APPLE." Attach one microclip to the second pin from the right, just under the "L" of "Apple."

Most manuals tell you to attach the other end of our shift mod device to the game I/O port—the place where you plug in game paddles, joysticks and the like. The trouble with that is you can have difficulty getting some game paddle plugs to plug when the shift key mod microclip is attached.

There's another alternative. First, locate the game I/O port. It's a white plastic socket without an IC installed, near the upper righthand corner of the motherboard, in row J. The row letters are printed in white ink along the left edge of the motherboard. Now locate the IC just ahead of the game I/O port, towards you, in the righthand position of row H. The number 74ls251 is printed on the motherboard just in front of this IC. Attach the second microclip to pin #1 of this chip. Pin #1 is the first pin on the right, toward you (that is, toward the front of the computer). The clip should hang directly over a capacitor labeled C55.

Now turn the computer on and go into your word processor's configuration program. When it asks you what kind of shift-key mod you have, enter the category marked "wire" or "game I/O." That's all there is to it.

Q. I'm interested in a musical "word processor," to write music on the computer. I don't want to synthesize a lot of different sounds, I just want to write music. Does someone make such a product for personal computers?

A. We checked with Mountain Computer and Passport Designs, both of whom make music products for the Apple II Plus computer. It turns out there are music editor packages on the market.

Mountain's Music System is a pair of peripheral cards that plug into I/O slots in the Apple's backplane, while Passport Designs sells a keyboard that can play music in conjunction with the Music System. Passport also sells a software package called Note Writer that the company says is the only real-time music transcribing system available for under \$27,000. It will only work for monophonic transcription, though, while the more expensive products give polyphonic capability.

Using Note Writer (the package costs \$95, and the hardware it runs with goes for \$1190) you play notes from the musical keyboard. The notes you play appear on the computer screen. Then you can enter the software's edit mode, and add, delete, etc., notes, time signatures and the like.

We suggest that you contact Mountain Computer, Inc., in Scotts Valley, Calif., or Passport Designs, in Half Moon Bay, Calif., for more information.

Q. How do I get my Apple II Plus to show upper- and lowercase characters like the Apple IIe does? Is it hard to do?

A. It's a pretty easy modification and it costs \$20 to \$35 for the part—a single character-generator IC ROM. The instructions come with this ROM, which is available at most stores that sell Apples. We have tested the Vista Vision 20, which costs about \$30, and the Dan Paymar chip, which works equally well and costs about the same.

Generally, you have to unscrew a group of screws from the bottom of the Apple case, lift the case off the chassis (being careful not to strain the strap connecting the keyboard electronics with the motherboard attached to the chassis) and locate a large IC labeled "ROM SPCL" at the very front of the motherboard, and normally out of sight underneath

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the keyboard. Then you take a small non-magnetized screwdriver and gently pry up the resident IC in the middle, between the rows of pins. Once it's loose, you can lift it out of its socket without bending any of the connecting pins. Make sure you note which way the IC goes, and put in your replacement the same way. There's a notch in the case, or a molded-in dot on the case of the IC that identifies pin #1. Make sure pin #1 of the new chip goes where pin #1 of the old chip was. Bad things ensue if you install an IC backwards, starting with instantly turning said IC into electronic mush the instant you turn the power on. Once the new IC is in the socket properly, put everything back the way it was.

When you turn on your computer you won't notice the new upper- and lowercase. You must reconfigure your software to recognize it, and some programs may not. Many packages will have a configuration section with a question asking whether you want the program to send upper- and lowercase characters to the display. Just say yes and you've got a display identical to the Apple IIe's 40-column display.

Q: I own a TRS-80 Model III cassette system, 16k, with a modem. I also own an Olivetti Praxis 35 electronic typewriter which I would like to convert for use as a printer with my system. Can this be done, or will it work only on the newest generation of electronic typewriters made with this in mind?

A: This is one of our most frequently asked questions.

There are a number of manufacturers who make interfaces for electronic typewriters. One such is MediaMix, located in Los Angeles. Another is Applied Creative Technology in Arlington, Texas. They make devices that in effect turn electronic typewriters into printers. You should contact the manufacturer

with the model of your computer and the model of your typewriter to make sure his device will work with your hardware.

If no one has a device for your particular computer/typewriter combination, you could try the TYROP, available from Hollander Office Products in Thousand Oaks, Calif. This is a bolt-on device that pushes down keys on the typewriter keyboard. We know nothing about the reliability of this device, only that it's available.

Q: Your recent article, *How a Computer Can Control a Home*, raised an important question. If the computer is controlling devices for days on end while you're not home, doesn't it get hot?

I have a ZX-81 and if you leave it on for more than a few hours the CPU burns out. I would like to try home control, but if this is the case it would be impossible.

A: That's an interesting question, for a variety of reasons. Many people don't like the idea of leaving a computer on while they're out of the house. They're afraid that a complex electronic device—which a computer admittedly is—might cause all kinds of trouble. First, there's the potential fire hazard. If something goes wrong, could the malfunction cause fire? Then there's the question of damage to the computer itself. Suppose there's a problem with a peripheral. The likeliest possibility is that some stray signal might get into a printer-control line, causing the printer to eject all the continuous-form paper it has.

Monitors can present a problem too. The phosphors on the screen lose their luminescence after a while, and the longer a character stays on the screen, the more likely the possibility that some of the spots in that character will burn out, leaving a permanent dark space on the screen. Both that problem and the printer problem can

be alleviated by turning off the appropriate device, but there are other devices that won't respond to that remedy.

Then there's the heat problem. We've never run into it with a Sinclair, but then we haven't left it on for long. We called Sinclair, and got only busy signals, so no comment there. We do know this, though; some computers, when loaded up with all the stuff they need to run a good home-control system, might tend to get warm. If they do, there are some solutions available. You could install a fan, which will pull cooling air over the innards, letting the computer keep its cool, as it were. You can modify the case by punching more holes in it to allow air to circulate. Of course, doing so might void any warranties existing for your computer.

Doug Mosher, one of the subjects of our story, got himself a Radio Shack Color Computer with lots of cooling vents, and he doesn't report a problem.

In general, we think you'd have a tough time making a home control system out of a Sinclair. That computer can do some things well, but home control is a tricky proposition unless there are packaged products for it on the market. You can get such products for the Apple and TRS-80, and for S-100 bus machines, but there aren't any for the Sinclair.

Q: In your March 1983 Answers column, you state there are no devices to convert an electric typewriter to a printer. Subsequently, eight pages later, you advertise a product that does just that. There are also smaller ads in the back of the magazine for such devices. Who's right, you or your ads?

A: We said there were no devices to convert an ordinary electric typewriter to a printer. We were careful to distinguish between electric typewriters, which are electro-mechanical devices that offer simple

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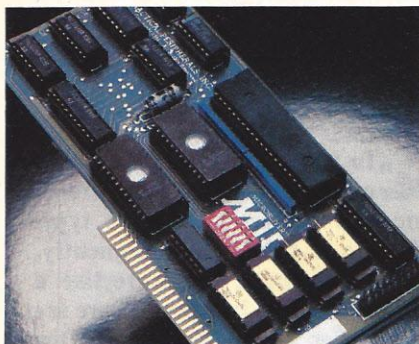
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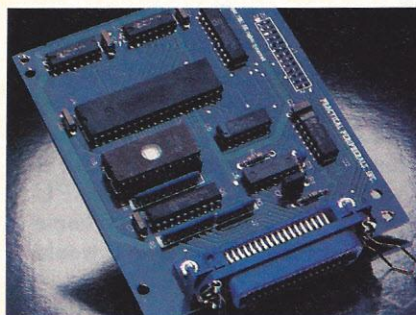
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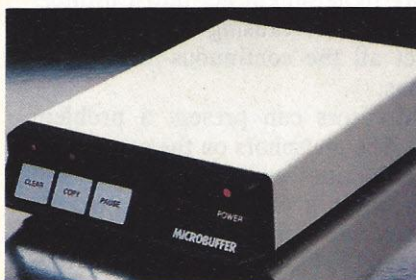


FOR APPLE II COMPUTERS, Microbuffer II features on-board firmware for text formatting and advanced graphics dump routines. Both serial and parallel versions

have a power-efficient low-consumption design. Special functions include Basic listing formatter, self-test, buffer zap, and transparent and maintain modes. The 16K model is priced at \$259 and the 32K, at \$299.



FOR EPSON PRINTERS, Microbuffer/E comes in two serial versions — 8K or 16K (upgradable to 32K) — and two parallel versions — 16K or 32K (upgradable to 64K). The serial buffer supports both hardware handshaking and XON-XOFF software handshaking at baud rates up to 19,200. Both interfaces are compatible with standard Epson commands, including GRAFTRAX-80 and GRAFTRAX-80+. Prices range from \$159 to \$279.



ALL OTHER COMPUTER/PRINTER COMBINATIONS are served by the stand-alone Microbuffer In-line.

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keystroking, and electronic typewriters, which have on-board electronics to decide what character is to be printed next. Electronic typewriters have easy keystroking, but they also have some local intelligence that enables them to be hooked into computers.

The ads to which you refer describe converters for electronic typewriters. These electronic typewriters can interface with computers using the interfaces our advertisers offer. Electric typewriters, those that offer only easy keystroking, can't interface with computers via common electronic interfaces.

However, read on.

Q: I just received my March 1983 *Personal Computing* and was interested in the title of your Answers column, "Can an electric typewriter be used as a printer?" I was amazed at your misinformation.

My answer to you is "Yes, Answers, there is an electric-type-writer printer adaptor." It's called a TYROP, and is distributed by Hollander Office Products, 41 Dusenber Drive, Suite B, Thousand Oaks, CA 91362. I am very pleased with this equipment, which is very easy to install and operate.

A: We always strive for complete and accurate information, but sometimes we fall short. We thank reader William Anton for his input.

Armed with Anton's information, we called Hollander Office Products and spoke with Dohn Maroney, operations manager. Maroney says the TYROP works well. He claims very few of the devices have been returned for repair, replacement, or adjustment. The TYROP sits on your typewriter keyboard, and pushes the keys in response to character codes sent from your computer through the proper interface and cable. The cable is supplied with the TYROP. The device is compatible with the IBM Selectric II or III typewriters, or

any with a comparable keyboard. It costs \$695.

If you call (800) 235-3524 or, (805) 496-2533 in California, you should be prepared to tell Hollander the make of computer you have, whether you have a serial or parallel interface, and what typewriter you have. Maroney says he has a comparison chart listing all the typewriters on which the TYROP will work, and he can tell you in a jiffy if the product is for you.

We should point out, however, that we are not endorsing this device. We simply know now that it exists. We believe the comments we published in our March issue concerning reliability of the typewriter itself are still a valid concern. Electronic typewriters and computer printers are designed to operate at data speeds that make them compatible with computer output speeds. Electric typewriters aren't. Rather, they are devices that are designed to operate at human input speed, which is a lot slower than computer output speed.

We don't know whether such problems would develop, but we know of an occurrence at a data-processing shop that relates to this issue. The operator's console used a Selectric mechanism for input and output to and from the 360/30 computer, clearly a mismatch in speeds. The shop experienced a fair amount of downtime because of the electronic and electromechanical components of the system as a whole, and one of the worst offenders was the operator's console. This was particularly annoying in that case, since the computer wouldn't run without commands from the console. It was like having a personal computer with a defunct keyboard.

So while we can report the existence of a device that allows plain old ordinary electric typewriters to function as computer printers, we feel compelled to recommend that you exercise caution in investigating such a device.

Q: I own a Xerox 820 II computer with 5 $\frac{1}{4}$ -inch disk drives. My problem is that a lot of CP/M software comes in 8-inch IBM-formatted diskettes. How do I get this software into my computer's format?

A: The dealer you bought your Xerox from should be able to download the non-copy-protected programs from the 8-inch format to your format in a few minutes. One store in the Sunnyvale, Calif. area will do it for \$35 an hour, and estimates it would take only five to six minutes per diskette, transferring the data at 9600 baud. You'll also find that many software manufacturers do make their software in a variety of formats. One mail order firm, 800-SOFTWARE (at that phone number) of Berkeley, Calif., estimated that two-thirds of its CP/M software is available in Xerox format.

One thing you need to watch out for is disk-space compatibility. That is, your receive disk needs to be able to take as much data as your send disk can hold. But the standard IBM single-density single-sided 8-inch format isn't very dense, so that normally won't be much of a problem. If you want to use very large programs, you might consider Xerox's dual-sided 5 $\frac{1}{4}$ -inch drives which hold 385k per drive, or even a pair of 8-inch double-sided drives which hold about a million characters per drive.

You can get the same results in 80-column mode by buying an 80-column display card, which usually costs around \$300. This will give you upper-/lowercase display in 80-column mode, but not usually in 40-column. So even if you buy an 80-column board your lowercase character generator may still be useful when you want to work in 40-column mode. Small children and people with vision problems will find 40-column easier. There are also some keyboard enhancer cards that fit into the Apple's expansion slots. Videx and Vista make some. They cost about \$125 to \$150. These pro-

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vide upper-/lowercase and often other functions as well, such as type-ahead buffers.

Q. My Apple won't start. It has a Mountain Computer CPS card running my printer and modem, and a normal disk drive controller card. One day I installed a 16k RAM card, and when I tried to turn the machine on the power light wouldn't even come on. I took out all the cards and the computer came on just fine. By a process of elimination, I found that it wouldn't go on with the CPS card installed. But I had the CPS card tested and it works fine. What gives?

A. Your CPS card has a battery-backed on-board RAM, which can get confused when you remove or install other expansion cards. Sometimes it gets fooled into assigning a phantom slot function to the slot containing your disk drive controller card—and then your disk drive won't work. The phantom slot function enables you to attach several devices to the CPS card and trick the computer into thinking that they're plugged into several slots in your computer, even though they're all physically connected to the CPS card in one slot. To get your system going again, your CPS reference manual has a series of commands you can give (on pages B3-B4) that will disengage the phantom slotting function. Then boot your CPS configuration disk and reassign the phantom slots as you wish.

Q. I bought a copy of the game Frogger for my Apple II Plus, brought it home, and found that the disk wouldn't boot. All I got was a constant ka-chunk, ka-chunk sound. But when I took the game back to the dealer, it worked fine on his Apple II Plus. Other game software works on my system. What's happening?

A. What's happening is yet another chapter in the ongoing battle between software publishers

and people who want to copy software. As the pirates get more sophisticated at unlocking copy-protected software, manufacturers are forced to adopt more complex copy-protection schemes. Occasionally this has interfered with the proper operation of the software itself. In the case of your Frogger game, the publisher, Sierra On-Line, chose a copy-protect system that will operate with Apple disk drives, but won't work with other common drives, such as those from Rana Systems. Several Sierra On-Line arcade games were similarly copy-protected, and the company is currently producing new versions of those games with a different protection scheme. Owners of diskettes that won't boot can either wait to trade their games for the new versions or exchange them for other Sierra On-Line games that don't have this particular copy-protection system. This whole problem of complicated copy-protection schemes is the reason that some people recommend that you make sure the disks you buy boot before you leave the dealer. In a case such as yours, however, not even that would have helped, apparently.

Q. I am looking for off-the-shelf software which can be used as an aid for studying the Bible. Is there anything available?

A. In our April 1983 issue, we ran an article called "A Congregational Computation" that told the story of how a church in New Jersey computerized its bookkeeping operations. Along with this article, is a column on page 100 that lists a few of the Bible study packages on the market. For those who missed that issue, the most popular spiritual software is The Word from Bible Research Systems (Austin, Texas), which contains all 4.5 million characters of the Bible on one set of floppy disks. A database manager attached to The Word allows users to call up specific

scriptural passages and their contexts. Also available are The Bible Study Series from ASGA Software (Memphis, Tenn.), Books of the Bible and Bible Test from Color Software Services (Greenville, Texas), and Bible Quiz from Professional Computer Systems (Bloomington, Ill.).

Q. I have had considerable experience with a statistical package for the social sciences in a large university. I would like to obtain as much or more power using personal computer software/hardware combinations. Do you know any manufacturers, associations, publishers, or directories that can give me information about such products?

A. The SPSS statistical package for social sciences, which may be the package with which you are familiar, is a large and powerful package for mainframe computers that has yet to be adapted to personal computers. However, there are several statistical packages available that offer many of the same features.

One such package is ABSTAT, published by Anderson-Bell. Retailing for \$395, it will run on CP/M or CP/M-86-based systems. It will also run on the IBM Personal Computer under MS-DOS. ABSTAT has statistical features like multiple regressions, missing values, analysis of variants, cross tabulations, and descriptive statistics. It is fully interactive, with features built in to assist people in manipulating their data—for example, it can directly read dBASE II files and can take random samples from them. For more information, contact Anderson-Bell, 425 Main Street, Suite 10, P.O. Box 191, Cannon City, Colo. 81212, or call (303) 275-1661.

Another statistical package is Statpro, published by Wadsworth Electronic Publishing. Statpro costs \$1995 and currently runs on the Apple II, the Apple IIe, the Apple II



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Plus, and the Apple III. Versions for the IBM Personal Computer and the IBM XT will be available in July. This package, comprising 26 floppy disks, has a data base and comprehensive statistical features, plus graphics capabilities which can create scatterplots, histograms, pie charts, and other statistical displays. For more information contact Wadsworth at 20 Park Plaza, Suite 1435, Boston, Mass. 02116, or call (800) 322-2208.

There are other statistical packages available with different features at different price ranges. To get more information about them, consult the directory Data Sources, available from Data Sources, P.O. Box 5845, Cherry Hill, N.J. 08034, or call (609) 429-2100.

Q: The Kaypro II computer I recently purchased comes with the CP/M 2.2 operating system. I've considered purchasing the Microsoft BASIC programming language but noticed that it runs on CP/M-80. What is the difference between CP/M 2.2 and CP/M-80? Does this prevent me from running M-BASIC on the Kaypro?

A: Not necessarily. There is only a difference in terminology in these two CP/Ms. CP/M-80 is CP/M that runs on the 8080 or Z80 microprocessor. The latter is the microprocessor in the Kaypro II computer. CP/M 2.2 is one particular version of CP/M-80. As software houses update a product, they frequently add suffixes to its name, like 1.1 or 2.2, to differentiate new releases, or versions, from old ones. So Microsoft BASIC should run under CP/M 2.2.

But you have to make sure that the disk you buy containing the BASIC is formatted so that your Kaypro can read it. CP/M has been tailored for different machines, and one of the areas of tailoring has been the disk formats. We have seen a program run on

a Kaypro that converts disks from various formats to the Kaypro format. So check with the dealer to ensure that either your BASIC can load on your Kaypro, or that the disk can be converted so that it will run.

Q: I have an Apple II Plus, with 80-column card, upper/lower-case, and a Microsoft Softcard (CP/M), on which I am working with CalcStar. I have a RAMcard in slot 1, which is supposed to give me 64k, but it apparently isn't enough. What can I do? My dealer hasn't come up with anything so far, but to do the financial planning I want to do, I need more RAM. I certainly would appreciate any help on this.

A: The first thing you need to do is make sure that your RAM card is in slot 0, not slot 1. Slot 0 is the only place you can plug in the extra memory on the Apple II.

Next, make sure you've updated the CP/M system you have to the 56k version. Apple CP/M from Microsoft assumes you have a 48k Apple, and hence is configured to look for only 44k of user RAM. When you have the 16k card in slot 0, you have to boot CP/M and then type CPM56 from the drive your system disk is in. This will update your system disk to look for 56k of user memory. Notice that you'll still be 8k short of the total 64k of RAM available. This is because of the way the Apple allocates memory to RAM and ROM, and there's nothing you can do about it, short of very heroic measures we haven't even considered trying.

Microsoft, however, has taken those heroic measures. You can get an upgrade for the 56k version of CP/M for your Apple for \$57.50, the company says. Check with your dealer for availability. But in the final analysis, CP/M-80 for the Apple II only knows about an address space of 64k. The amount over 56k is used for systems programs.

Another possibility is a product

from Advanced Logic Systems in Sunnyvale, Calif. We're told ALS has a bank-switching scheme available with one of its add-in memory cards which lets you bank-switch memory under CP/M. That might or might not work with CalcStar.

If none of these prove to work or be available, then we're afraid you're stuck. You could try switching to VisiCalc, with some of the extra-large memory boards specifically designed for use with that program. Such boards use memory management to get you more effective memory. One example is the board from Saturn Systems, located in Ann Arbor, Mich. This company claims you can, using its card with its preboot, get up to 177k of VisiCalc memory and support for your lower-case card. The board will also support CP/M, but only by providing a disk emulator in RAM, making disk access quicker. There is no support for CalcStar other than that.

Q: As a relative beginner, I find myself being left in the dark by what appear to be "simple" discussions of fundamental things in the world of personal computing. The terms are foreign to me, and I guess I just lack the basic knowledge necessary. Is there any book available which would acquaint me with the basic jargon so I wouldn't feel so ignorant? I don't even know what CP/M means when I see it mentioned.

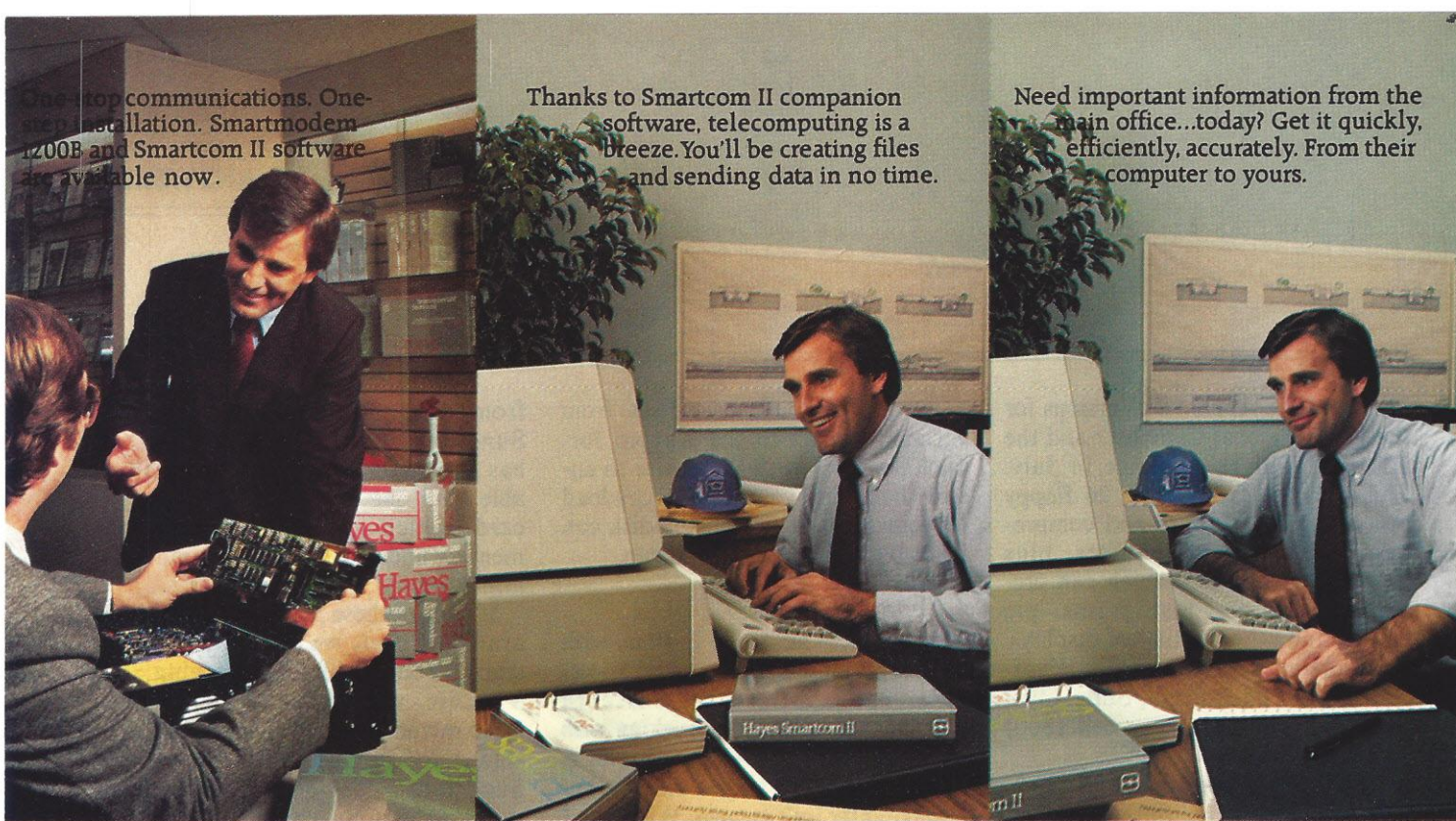
A: CP/M means Control Program for Microprocessors. It's one of a class of programs called operating systems. These programs provide overall direction for the applications programs, like word processors and spreadsheets, telling those applications programs where files are, where the output device, printer, or screen is, and things like that. CP/M gets mentioned so much because it's a very popular operating system. Other popular operating sys-

(continued on page 43).

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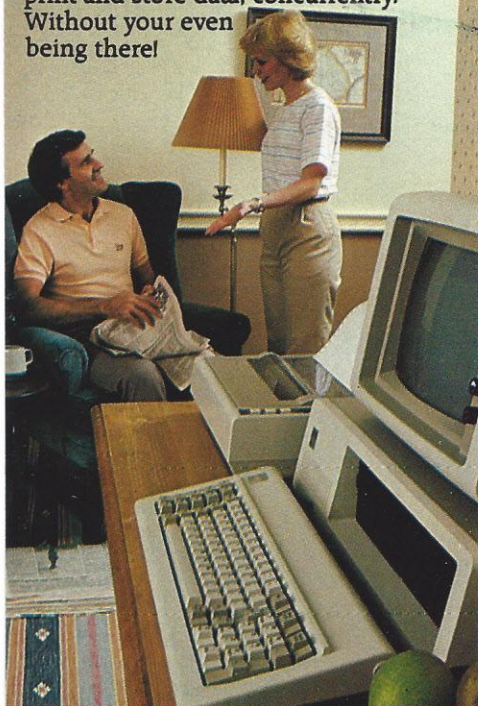
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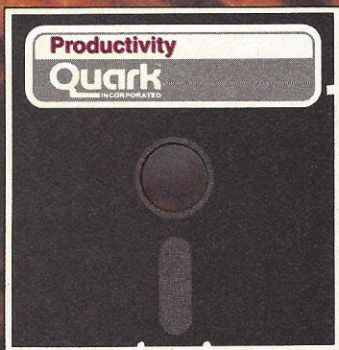
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(continued from page 39)

tems now are MS DOS (DOS means disk operating system), the same operating system found on the IBM Personal Computer under the name PC DOS; UNIX, and its variant from Microsoft, Xenix, Oasis; Apple DOS; TRSDOS; LDOS; and Turbo DOS. There are others, not quite as well known. They all perform the same function—they tell the applications program how to run. At the same time, they tell the computer how to interact with its peripherals and its operator.

As far as books are concerned, there is a plethora of publications for those beginning in computing. We suggest that you check out a local book store, because many general book stores are starting to carry several computing titles. One book we particularly like, and which we plan to review soon, is *The Personal Computer Book*, by Peter A. McWilliams, from Prelude Press, in Los Angeles, Calif. This book, which retails for \$9.95, starts off simply, but manages to explain concepts that are quite esoteric in a simple and down-to-earth manner.

Q. I own a Xerox 820 computer with dual 5¼-inch floppy disk drives. What sort of preventive maintenance do you recommend for the disk drives?

A. Xerox and quite a few other companies make head cleaning kits for 5¼- and 8-inch disk drives. The kits, which cost around \$30, generally contain diskette-shaped cleaning disks. When these disks are impregnated with a cleaning solution and run in your drives, they remove accumulated disk oxide coating and environmental contaminants from the drive heads. However, some drive manufacturers have indicated privately that overuse of certain cleaning kits wears the head surfaces down, because of the abrasive qualities of the cleaning kit. On the other

hand, accumulated "tar" on the heads can cause imperfect data recording and reading, as well as wear on the diskettes themselves.

The solution is to clean the heads with relatively non-abrasive head cleaners, and no more often than necessary. The least abrasive cleaning disks appear to be the ones you wet with a cleaning agent just before use, or which come premoistened in a foil wrapper. As to how often—there's no real consensus on how often "often" is. Shugart, a firm that makes many of the floppy drives used in personal computers, recommends cleaning drives after 40 hours of use.

Q. I have a Commodore VIC-20 and I would like to know whether anyone manufactures a 40- or 80-column expansion card or plug-in module for my machine.

A. Commodore's VICterm 40 gives you a 40-column display, but only in telecommunications mode. However, several manufacturers make video expansion devices for Commodore products. Quantum Data makes a 40/80 column display device for \$299. You can contact the firm at 3001 Red Hill Bldg. 4, Suite 105, Costa Mesa, Calif. 92626, (714) 966-6553. Data20 Corporation makes a similar device, as well as a line of other expansion devices for the VIC-20 and Commodore 64. Data20 is located at 23011 Moulton Parkway, Suite B10, Laguna Hills, Calif. 92653, (714) 770-2366.


Q. Can I use an Amdex Video monitor with a VIC-20 computer? If not, could you list other monitors that could be used?

A. Yes, there's a way. Amdek's AC300 cable, for \$22.75, will hook up a VIC-20 or Commodore 64 to the Amdek Color 1 composite color monitor. You can order the cable from the same source you're using for the monitor.

Q. My Apple II Plus's power supply seems to be failing. I have to remove all my expansion cards—including the disk drive—in order to get it to power on, wait for it to warm up, then put in a couple of cards—just enough for my minimal needs—and go to work. What does it take to change power supplies? As far as I can tell, I wore out the supply by stuffing all the expansion slots with boards and running the machine non-stop for long periods of time. Are IIe power supplies equally fragile?

A. The Apple power supply is easy to change. Just unplug it from the Apple's motherboard and unscrew six small screws on the underside of the case. The power supply slips right out, and authorized dealers will charge you \$90 and exchange it for a new one. It should take you 15 minutes to do it. Apple's own data sheets reveal that it's easy to overload the Apple's power supply, which wasn't designed to handle more than about a 2-amp load.

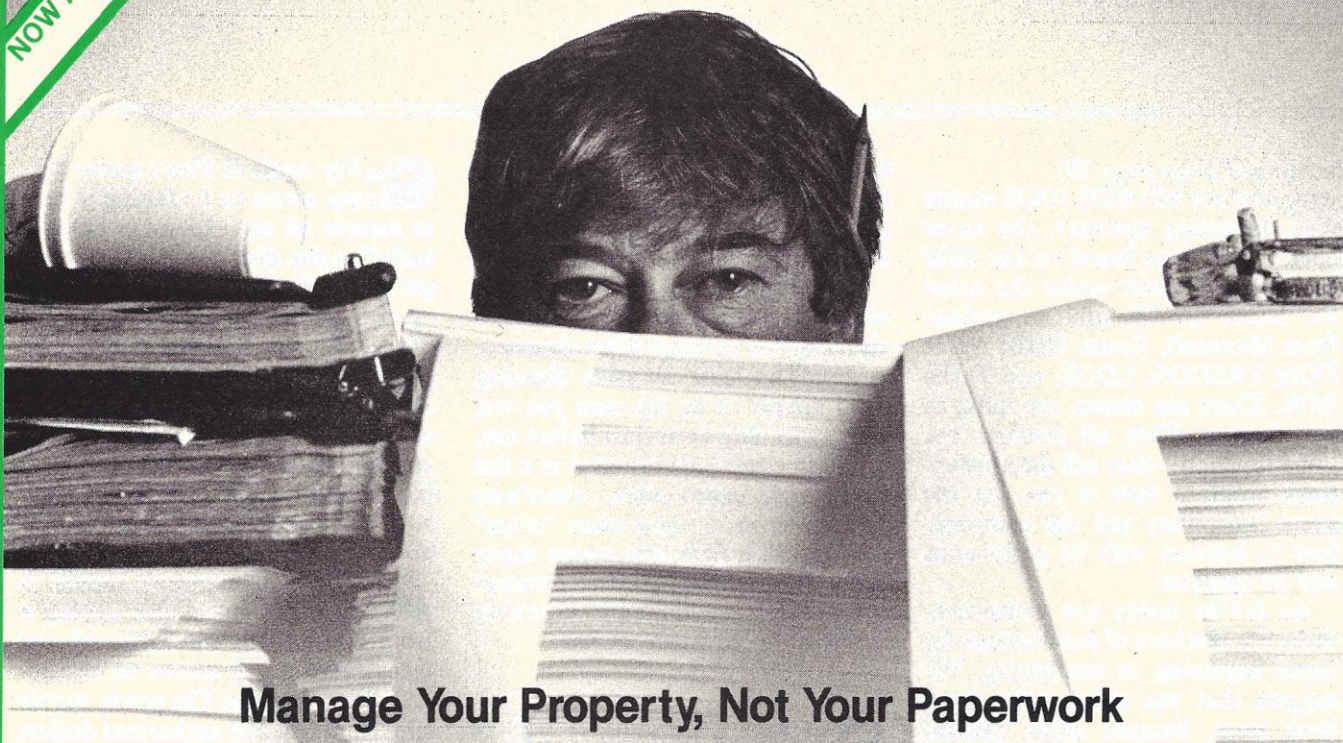
M&R of Santa Clara, Calif. makes a heavy-duty power supply that mounts outside the Apple. It wouldn't fit inside, and it stays cooler outside the computer anyway. But the price is \$275.

One warning: Some other power supplies are currently being touted as "Apple-compatible" and as having a greater load-handling capacity. One we looked at sold for about \$70 instead of the \$90 for Apple's own. But when we tried to connect it we found that it had an incompatible motherboard plug. The dealer advised us to cut off the plug and splice on the plug from our old Apple power supply. We were just pointing out that the color coding on each device's wires differed when a customer came in who had succeeded in making the splice. He said the power supply was now dead and he wanted his money back. The dealer admitted they had been getting a lot of returns. The moral: Look at track records before purchasing a product. 

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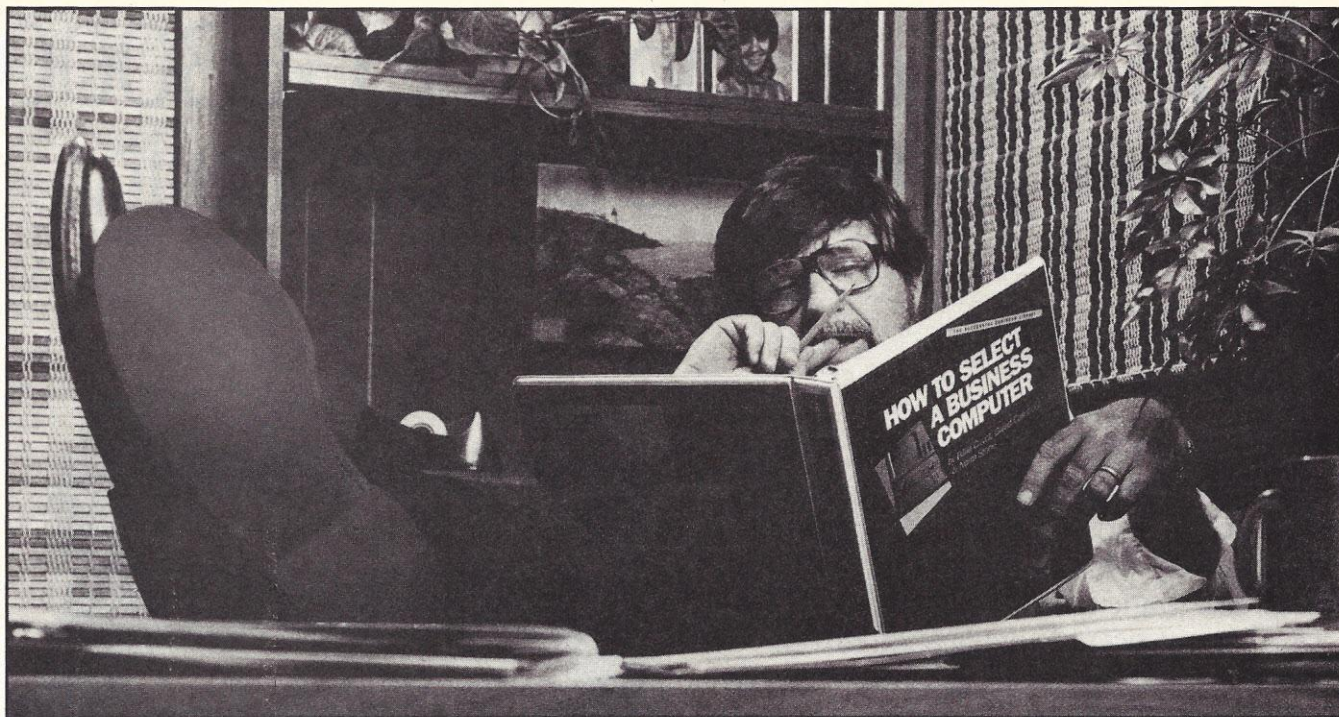
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Natalie Dehn Reflects On Artificial Intelligence

Artificial intelligence research is one of the most exciting frontiers in computer technology today. Even the simplest computers handle information and can be programmed to make certain types of decisions. But one trend in artificial intelligence research is to make programs and machines that are somehow "smart"—that is, capable of reasoning and judgment, of reacting to sensory input such as sight and sound, and even of conversing with people in natural language. Creating such artificial intelligence in a machine requires a close examination of natural intelligence in people, and the processes by which the human mind perceives, judges, and creates.

One indication of the interest in artificial intelligence research is the number of AI (artificial intelligence) projects underway at university and research laboratories. The American Association for Artificial Intelligence (AAAI), founded in 1979, presents a number of conferences in the U.S. and abroad, and publishes research papers. AI has been the focus of such books as *Artificial Intelligence and Natural Man* by Maggie Boden and *Machines Who Think* by Pamela McCorduck. And several companies, such as Excalibur Technology in New Mexico and Infocom in Massachusetts are marketing programs intended for personal computers, which take advantage of AI techniques in responding to natural language and unexpected inputs.

One of the centers of artificial intelligence research is Yale University, and one researcher there is Natalie Dehn. An electrical engineering graduate from MIT in 1975, Dehn, a doctoral candidate in AI, is developing a computer model of creative reasoning and invention.

What exactly is a good definition for artificial intelligence?

Dehn: There are many fields which have evolved out of early artificial intelligence research, and anyone working in any of these traditions can claim to be doing AI.

At one extreme is cognitive science research, such as that being done here at Yale and at MIT. We're interested in figuring out how the human mind works. The Yale AI department works very closely with psy-

chologists. The two heads of the AI lab here are Roger Schank, a computer scientist, and Bob Abelson, a social psychologist.

The other extreme of AI—Ed Feigenbaum at Stanford is one of the major forces—is concerned with expert systems. They're trying to write programs that can do tasks which require certain types of expert knowledge.

You say that your branch of artificial intelligence is cognitive research. What is your specific interest?

Dehn: I'm interested in studying creativity: How does a person take an idea and develop it in an interesting way? The two programs I'm working on are programs that will make up stories. One is called Author, which is a computer model of an author's memory, and models how initial kernels of ideas develop into complete stories.

The other, Starship, is an "application" program based on Author. It is a literacy game that makes use of the computer's ability to make up stories to teach adults to read better, to better understand what they read. Starship, unlike Author, makes up interactive stories, with the reader making important decisions on behalf of the story's protagonist.

Why are computer programs a good way of exploring human cognitive processes?

Dehn: There are different kinds of scientific methodologies you can apply in trying to understand the human mind. You can try to design experiments that will discriminate between alternate theories, and then run them on human subjects. Alternatively, you can build computer programs that are explicit models of how the mind works. Writing computer programs gives you a lot more power to

"I'm interested in studying creativity: How does a person take an idea and develop it?"



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play around with than other types of psychological models. For one thing, devising the program really helps you develop and refine cognitive models a lot more rigorously. Also, computer models differ from other types of models in that they actually run. You can see how close a model is by how well it works.

What insight have artificial intelligence computer programs given to the nature of human intelligence?

Dehn: What seems to be a key distinction is that computers operate on algorithms and people operate on heuristics. An algorithm is a mechanism which is known to work, and is guaranteed to give you the right answer every time. A heuristic is a general rule which isn't guaranteed to work, but it might, and is a good way to go about trying to do it.

When computers first came out, any kind of computer seemed very smart. These were artificial brains. Computers could be very fast and very accurate in mathematical calculations—that is, algorithms. The reason why computers seemed to be so smart is that the kinds of humans who are very good at doing calculations very fast and accurately also tend to be smart by other criteria.

But the things that were most impressive about the early computers are things that now make computers look very stupid—that is, the fact that they do algorithms very well but heuristics very poorly. Now, normally you say a heuristic is just a very sloppy way of doing an algorithm. Why wouldn't you always want to use an algorithmic approach instead? The answer is that usually heuristics can save you a lot of time—they're shortcuts.

Computers are good at functions that actually turn out to be quite simple. Those functions are almost always algorithmic, like arithmetic. People are very bad at arithmetic because the human mind is designed around heuristics. In order to do algorithmic things we have to use mech-

anisms that are not optimized for that type of thinking. But in human life the kinds of situations you must handle algorithmically are very limited. Most activities are not algorithmic—even such seemingly straightforward tasks as food shopping. People are very good at being able to respond intelligently, and to adapt, and to apply rules. Those are difficult things to make a computer program do.

So it turns out that the original sense in which computers were thought to be intelligent was actually a very bad limitation. Although computers could perform well, much better than people in certain cases, they could handle only a small subset of problems. To this day there is a weird

“Devising a computer program helps you develop and refine cognitive models more rigorously.”



contradiction in that computers can do forms of math that only very smart people can do; on the other hand, making a computer capable of something like natural language processing or visual processing, which even a small child can accomplish, is still a subject of massive research. The point is, people don't do these complex things algorithmically.

The idea behind a heuristic is that you're willing to give up complete accuracy as long as you get the common cases right most of the time.

This business about making judgments, such as going into a store and finding out that your favorite brand of cereal is gone, so you decide to get the next one: Can you write a computer program capable of doing that kind of human pinch-hitting when the contingency is not defined?

Dehn: You've hit exactly on the theme of a thesis chapter I'm writing. One of my concerns is a model of human intentionality. How do people go about reaching their goals? You can't simply have a list of rules stating if-then, if-then, if-then. What you really need is a model of how knowledge is organized in memory.

In very early AI research, people weren't worried about knowledge at all. Somehow they seemed to feel that if people were using prior knowledge in solving a problem, they were cheating—they weren't being intelligent. However, if you consider something like natural language processing, it turns out you need a tremendous amount of prior knowledge. It's not a matter of cheating.

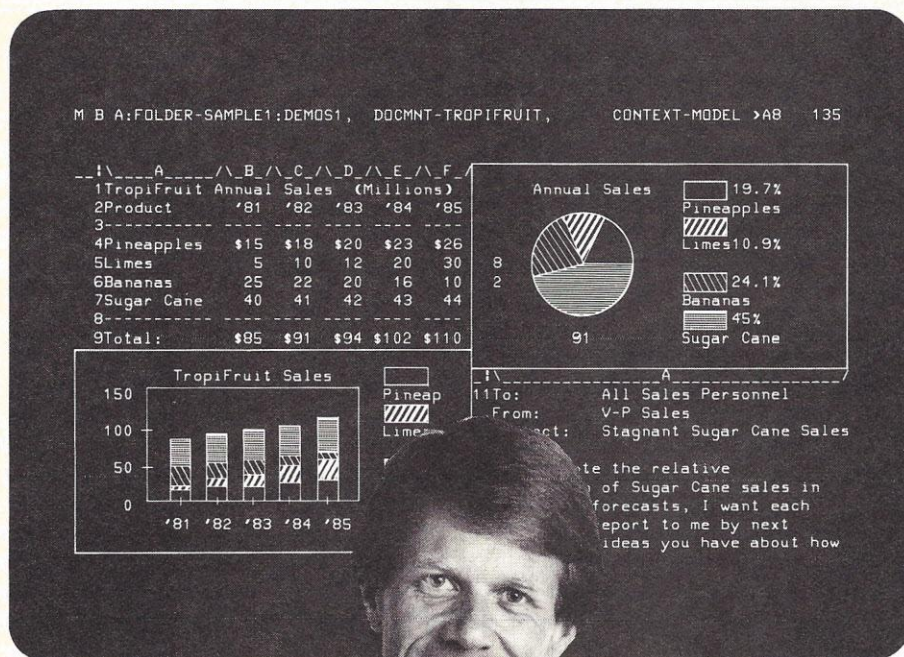
One of the classic examples in this lab is a sentence like “The policeman held up his hand and stopped the car.” You know there's a person inside the car who isn't mentioned, that he put his foot on the brake, and that the policeman wasn't stopping the car physically but was raising his hand in a signal which the driver interpreted as a request for him to stop. The policeman was also an authority figure: Normally one obeys such a figure un-

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less one has reason not to . . . and you could go on listing all the pieces of knowledge that you have and make use of in understanding this sentence.

In fact, this is one of the reasons why computer programs are such a useful way of exploring these cognitive issues. If you leave out necessary information the program won't work. This helps you to see where the problems are and to debug your theories.

Another important aspect of human intelligence is the kind of inferences you make. For example, one of Roger Schank's favorite examples is the Mohammed Ali Problem: Suppose you're told "John hit Mary." You're going to infer that Mary is probably hurt, that John may be angry at Mary; you'll read all sorts of things between the lines that haven't been mentioned. But suppose you're told instead that John saw Mohammed Ali and punched him in the nose. Now you're going to worry about what happened to John! Here you react to your knowledge about Mohammed Ali and to other abstractions about fighters in general.

This brings us to the direction this lab has taken during the last couple of years—investigation of models of memory: How is it that the knowledge we know is organized? How do we draw our inferences and hypotheses about new situations?

Let's explore creativity a bit. I've heard it said that musicians seem to be native computer programmers. Now, when people think of computer programming, they tend to think of something very logical. When they think of music, they tend to think of something with a high degree of structure, but with a certain type of inspiration—and the structure exists to support the inspiration. Is there a certain level of inspiration in the musical sense that can go into programming?

Dehn: The term "computer programming" is applied to tasks that are really very different. For exam-

ple, when you talk about an adult engaged in writing, you're not talking about an adult making an uppercase A and a lowercase B—you're talking about a composition process.

Similarly, translating a given procedure into computer code is an activity very different from personal computing, where you have something you want the computer to do for you. You can capture the spirit of personal computing in writing code. But if you have the attitude of doing only a mechanical translation—that is, if you have that kind of mind—your results are going to be quite different from those of a person who likes to "play." Computers actually encourage you to play, to try things out, and if they're fun, you'll do them

"Two vital ingredients in creativity are a playful spirit and a willingness to make mistakes."



anyway even if they're not necessary. ***Do you think playfulness is an essential ingredient in the whole creative process—and not just what comes along for the ride?***

Dehn: Oh, absolutely. I think that two very important ingredients in creative processes are a playful spirit, and a willingness to make mistakes.

In school for example, often you have the feeling there are right answers and wrong answers, and you should be able to get them all right the first time. But to create in the first place, it's extremely naive and misleading and harmful to think that most of these things have to be done right the first time around. If people are afraid of making mistakes, then they're going to be afraid to try things at all.

There's a metaphor coming out of the computer culture: debugging. In the literal sense, when you write a program you expect that things will be wrong with it, and you have to figure out the problems and fix them. You don't expect to get something that size right the first time; it's become a very powerful metaphor that to do anything of interest you probably won't get it right the first time. The main thing is to get started.

This has now become my style: I tend first to be fast and sloppy and make a lot of errors—even typing, and then go back and fix them later. If you're in an environment where it's cheap to make errors and patch them easily, you'll be able to get your main ideas out without being inhibited. Most of the time you won't make errors—you'll be able to go very quickly and get most of it done right, and then go back and focus your attention on the things that have problems. So there's a whole different style of working.

Also, you frequently learn the most from making errors. If you believe something is going to work and you try it and it doesn't, you're going to be curious as to why. Then you can play.

(continued on page 213)

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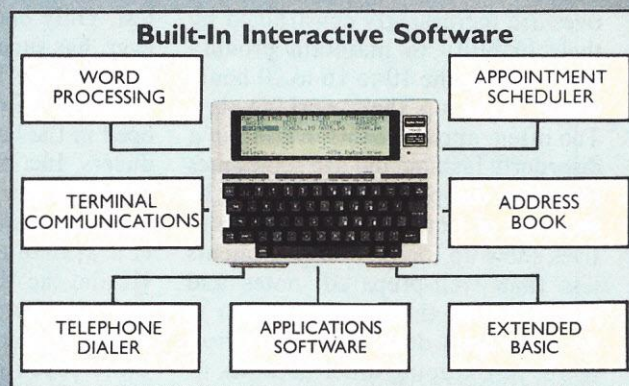
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Time Is Of The Essence

Time management software packages
can help executives make better use
of their most valuable resource

by Jeffrey Rothfeder

Peter Drucker, the highly respected management consultant and author, has been crisscrossing the nation for the past few years holding seminars on executive efficiency. He has one pet theme which he hammers home as often as he can: The most important resource that managers have to manage is their own time. Time management is more important than people management, he says, because time is the one thing that can run out.

Drucker's point is sound. Executives are increasingly constrained by their inability to maintain productivity during the 10 to 16 to 20 hours which make up their working day. Too often, appointments overlap in a disorderly fashion and are sometimes forgotten completely; worse still, the shortage of time often makes executives show up for their appointments less than well-prepared; notes and memos listing things to remember to do overwhelm desks and get buried; in all, just keeping order becomes itself a waste of time.

It would seem obvious that the personal computer, with its reputation as an enhancer of the quality of work, would be a perfect time management tool. Unfortunately, though, this concept has been slow to develop. While the computer has proven its power in data and number management, time management has lagged behind. Nevertheless, there is renewed inter-

est in this application. Some currently available software and hardware products—as well as various new packages—are finally enticing managers to add time management to the variety of ways in which they use their personal computers.

Most executives will agree that using the personal computer to store appointment schedules, flag reminders onto each appointment, and serve as a daily notepad would repay its dollar investment within months. But few people have put this theory to the test. Only one package, Time Manager, has succeeded in bringing computer owners to this use in significant numbers. Time Manager was developed in the late 1970s by Image Producers, Inc. of Northbrook, Ill. (The company has since changed its name to Datamension Corp.) Time Manager is available for the TRS-80 Model III and the IBM Personal Computer and was formerly marketed for the Apple II, but Microsoft, the distributor, recently pulled the product from the shelves. Nearly 20,000 copies of Time Manager have been sold to date. Beyond Time Manager, though, software of this type has not done well. Products have entered and left the market with all the predictability of a revolving door.

Apparently, the main reason people have shied away from using the computer for time management is that they feel it would mean using

their computers solely to keep track of their daily schedules. They think that using the computer for time management would necessitate keeping the software constantly on-line, something that would turn the computer into nothing more than an expensive calendar. The concern is in some ways warranted, but those who use time management software successfully say that that attitude speaks a narrow view of the concept.

Stretching the concept

"I know of very few people who are using time management software purely as an appointments calendar," says Al Baker, who, with Jeff Gabors and Dick Ainsworth, created Time Manager. "That is belittling the notion of time management and is not the true purpose of these packages. It is more often used as a very friendly data-base manager, as a note and memo keeper, as an organizer which can, as an added value, also keep time."

Baker's view is shared by most users. As a result, developers of some of the more recent time management software are taking pains to make their products fill a wider marketing niche. The Desk Organizer from Conceptual Instruments in Philadelphia, Pa., which is currently the chief rival of Time Manager for IBM Personal Computer users, is described as a desk management system, rather

Using the computer as a daily notepad would repay its dollar investment within months.



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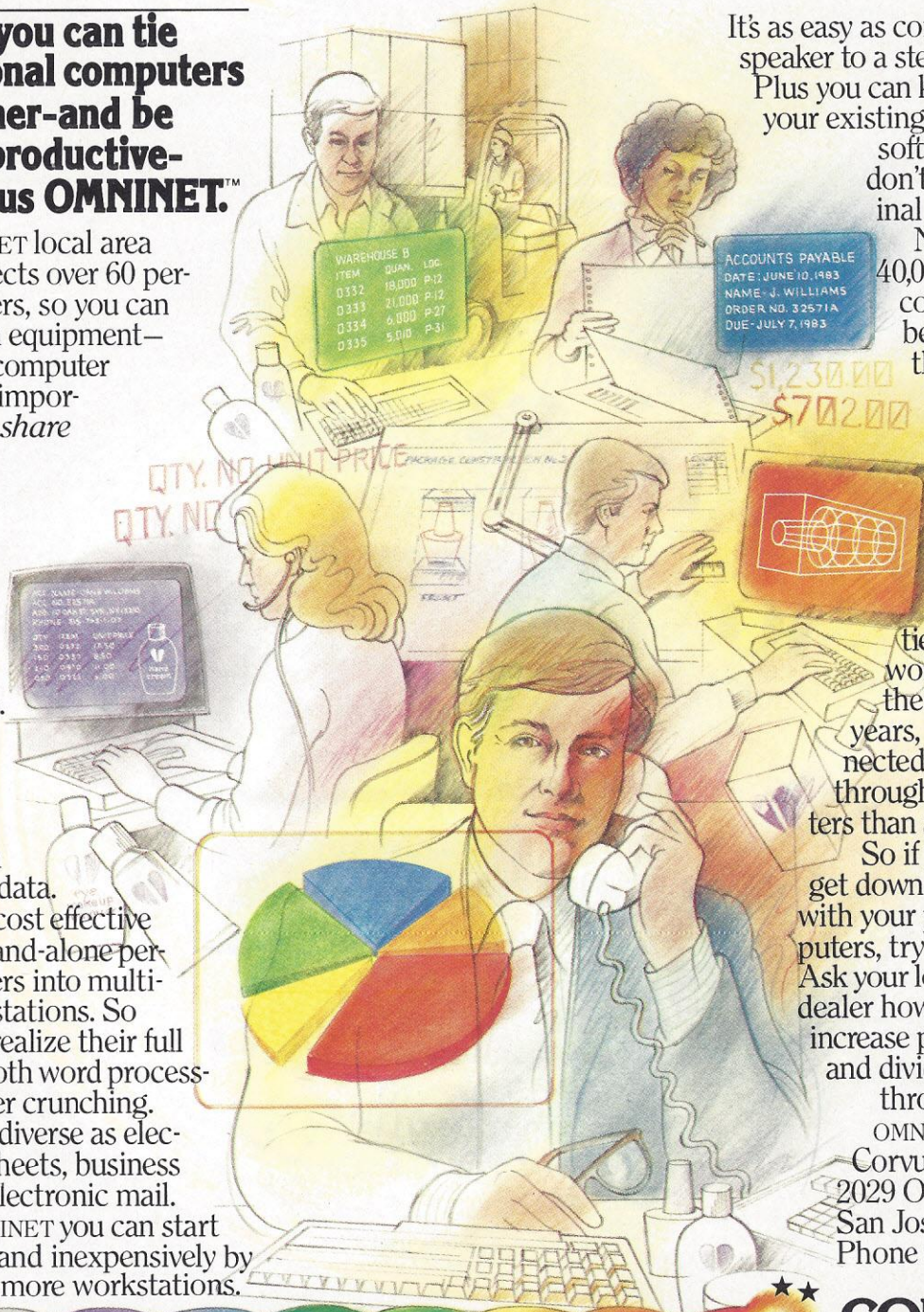
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"We have attempted to use the desk as a model to be organized by the computer."

**PROFESSIONAL/
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than a time management system.

"We have attempted to use the desk as a model to be organized by the computer," says Fred Collopy, the designer of the software and president of Conceptual Instruments. "The look and feel of familiar tools already found on your desk—the calendar, the notepad, the clock, the Rolodex—serve as the basis of our product."

By stretching the limits of the notion of time management, software developers have created tools that work successfully and to a large degree overcome past user complaints. Typically, time management packages are based on a running calendar and time clock which keep track of appointments and provide room for at least a note to be attached to each appointment. But as the time management concept has expanded, software packages have begun to include such extras as a mini data-base manager for longer notes in which information can be called up by the use of a keyword; a communications roster that keeps a log of phone numbers and, in some cases, will dial those numbers for voice or data use; a calculator with arithmetic formulas that tracks loan payments and the progress of investments; and the ability to print all of this out in hard copy.

Desk Organizer is a good example of how the newest generation of time management software works. This is actually the second incarnation of this product. The first, called Organizer, came with a time clock and was available for the Apple II. It was discontinued because of hardware and software glitches. The current version, called Desk Organizer, is only available for the IBM and has no accompanying time clock.

In Desk Organizer, the screen is divided into three components. The bottom half contains space for notes up to 80 characters wide by 12 lines deep. The top left half is the monthly calendar and the top right half is an index of all the keywords you have

assigned to the notes you have written. The index is automatically alphabetized and is similar to the Rolodex found on most desks. When you want to return to a note, you simply "flip" through the index to the correct keyword, ask to recall information attached to that keyword, and all the notes written to that index heading will be displayed. The calendar is attached to the index labeled "appointments." Notes filed in this index are displayed and can be printed out when you ask for all your appointments on a particular calendar day.

In the uppermost right corner of the screen is a real-time digital clock. This is, of course, only functional when a clock card has been slotted into the computer. When the time for an appointment arrives, the clock triggers a variety of alarms using chimes and graphics.

Desk Organizer's notepad, calendar and clock functions are all integrated with the calculator, telephone dialer, and date stamping functions. You can switch back and forth between any of these uses, and all the others will remain on hold, waiting to be used.

Creating order out of chaos

Joe Duncan, a chief statistician at Dun and Bradstreet, Inc. in New York City has used Desk Organizer on his IBM Personal Computer for almost a year, first as a test user for the software and most recently as a regular user. His work involves putting together statistical models and data bases for Dun and Bradstreet clients. Most of the time he uses his computer and dBASE II to organize his information. The rest of the time he uses Desk Organizer to create order out of the chaos that his time and desk can too easily become.

"I use the software as a card index," Duncan says. "In my daily research, I read a lot of materials and unless I have a way to keep track of these materials they end up in a dis-

organized mess of notes pads buried on my desk. So I store the titles and dates of these materials—articles, journals, etc.—using separate keywords on my Desk Organizer index. If I have to recall any of the research materials, all I have to do is recall a keyword."

He also "stamps" the date and time the research is entered into the program using the calendar and clock function. He does this so he can clean out old references—usually those six months old and older.

"As for time management," Duncan adds, "I still use my paper appointment calendar for keeping track of who I have to see. But Desk Organizer serves as an excellent 'ex post' time manager for me. At the end of each day, I enter into the program a log of expenditures so that I keep a running record for income tax purposes."

Duncan says he'd like to use a time management package to track appointments, but the problem of having to quit dBASE II in the middle of a data search and boot up Desk Organizer just to see if he is busy on some day four months from now dissuades him.

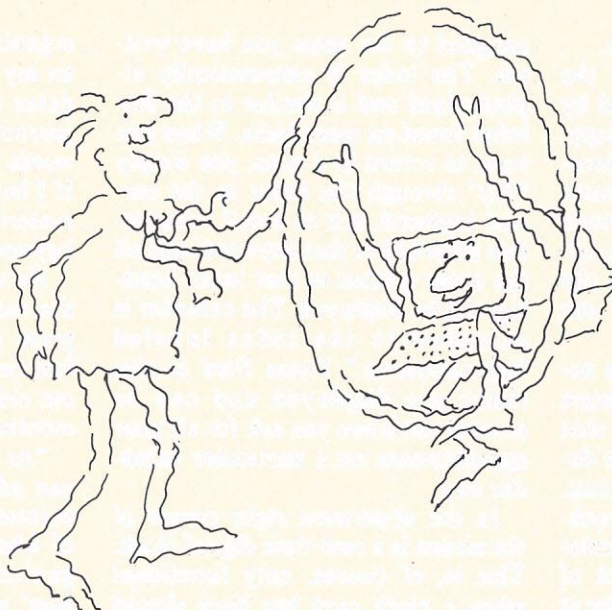
"It frustrates me," he says. "Ultimately, I want to get into one computing environment and work with that environment only, but that's not really possible currently."

It may be difficult for Duncan to use time management to its fullest potential, but Harold Sweat, an attorney in Richardson, Texas, has decided that time management is so important, he's devoted his computer almost totally to that task.

"I sometimes use the computer for VisiCalc," Sweat says, "but basically it's for time management. I keep the software booted up most of the day."

Sweat, who mainly handles wills, probate, and tax matters, uses Time Manager on an Apple II Plus. Time Manager is missing some of the fancy accoutrements of Desk Organizer—there's no phone dialer or date stamp-

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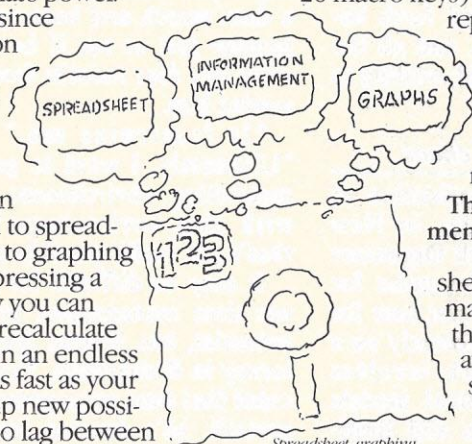
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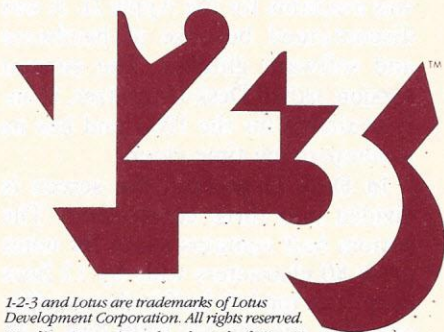
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Personal computers have battled data overflow successfully.

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er, for instance—but its reliability record is strong, and, as Sweat has found out, it's more than capable of organizing his work life.

"Probably the most important use of the program for me is that it lets me keep records on what needs to be followed up. I can make sure I don't miss a hearing or an appeal or make sure that contracts are executed on time. Many times a contract execution is scheduled for six or seven months down the road. By putting the date on Time Manager, I can be sure that the program will flag me when that date has arrived."

Each morning when Sweat arrives at his office, he boots up Time Manager, which is connected to a Mountain Time Clock, and lists all the appointments, updates, and follow-ups he has to take care of during that particular day. At night, before leaving for home, he checks to make sure he has accomplished what was scheduled for the day and updates a journal of his activities. This enables him to monitor work flow; from time to time he goes through his work log and evaluates how well he is using his time.

"It has all made my work life more bearable," Sweat says. "And I am a much more efficient attorney. Time Manager, for instance, cuts down on the embarrassing 'I don't know. I have to check on that' attitude that used to be normal. Now checking on something just requires looking up the last date the client saw me in my Time Manager calendar and referencing that to the upcoming date. Usually with each appointment I type in that kind of information in the accompanying notepad."

Making a choice

Both Duncan and Sweat have had to come to grips with the question of keeping time management software on-line all the time. Duncan has chosen not to, and this limits his use of Desk Organizer; Sweat has chosen the other path and uses his Apple al-

most exclusively for Time Manager. But this issue is purely a byproduct of time management software. Some innovative hardware manufacturers have overcome this problem by supplying built-in appointment calendars as part of the computer. The calendar is always running in "background," as it is called.

The oldest product of this type is Hewlett Packard's HP-75, which has been on the market for nearly two years. This lap-held portable computer with a single-line read-out has four main components: a spreadsheet module, a word processing text file, BASIC programming language, and the appointments mode. Using the appointments mode, which will continue to operate while the user is working in any of the other modules, a user can enter any number of appointments in the upcoming week with messages up to 50 characters. An alarm will sound when the appointment time has arrived, and the message can be recalled onto the read-out.

Hewlett Packard's technology was somewhat ahead of its time. The built-in appointments manager was an original concept that was not successfully imitated until recently when Radio Shack introduced a similar function in its TRS-100 lap-held computer. It is a very simple example of time management, but one that has proven to be particularly successful. Portable computers, especially notebook-size ones, are perfect vehicles for integrated appointment calendars. People who have worked closely with this technology over the past few years believe it will soon extend to non-portable desktop machines. "It is based on CMOS chip development," says Steve Ruddock, a Hewlett Packard spokesman. "CMOS chips require very little power to fuel them. As they become more common you will probably start seeing the 'background' time manager become a hardware function."


In the meantime, software devel-

opers are not standing still. Conceptual Instruments is evolving its product towards providing a hook that attaches Desk Organizer onto such software as WordStar and MultiPlan so that a user can move out of the primary package to reach Desk Organizer with one key command. From there, he can check on appointments, dial phone numbers, perform calculations, and then move swiftly back into the word processor or spreadsheet.

Other software

And other time management software is being integrated into turnkey vertical market computer systems. For instance, Computer Assisted Patient Systems, Inc. of Leonia, N.J. is preparing to market an IBM Personal Computer unit that "takes every bit of information and paperwork that moves through a doctor's office and puts it into the computer," according to Mike Kadish, a co-owner of the firm. CAPS has chosen 25:01, a time management package from Softrend, Inc. of Charlottesville, Va., as the appointments section of the turnkey system. "It will monitor appointments in 15-minute segments," Kadish says, "and be integrated so that the doctor or his aide can move from the time scheduler to a patient's file by pressing a command key."

And for those who are simply looking for a basic non-integrated appointments calendar, far less expensive programs than Time Manager or Desk Organizer—both of which are in the \$200 range—are available.

Executives can't help but be concerned with how well their time is managed. All the clichés—"Time is money," "Time waits for no one," and on and on—come back to haunt those who take the matter less than seriously. Personal computers have battled data overflow successfully. If used properly, examples attest, they can also provide the power to manage time more effectively. 

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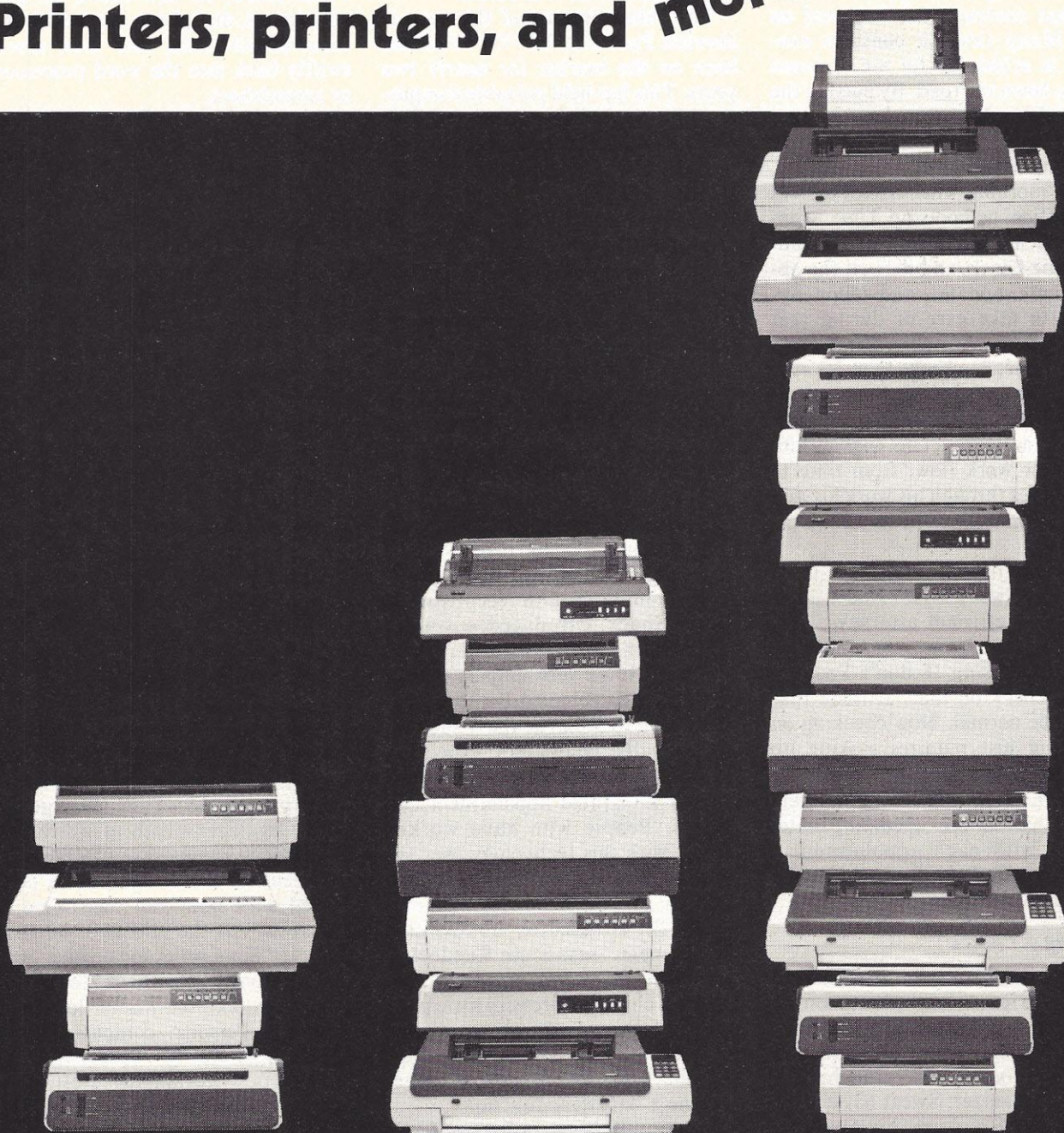
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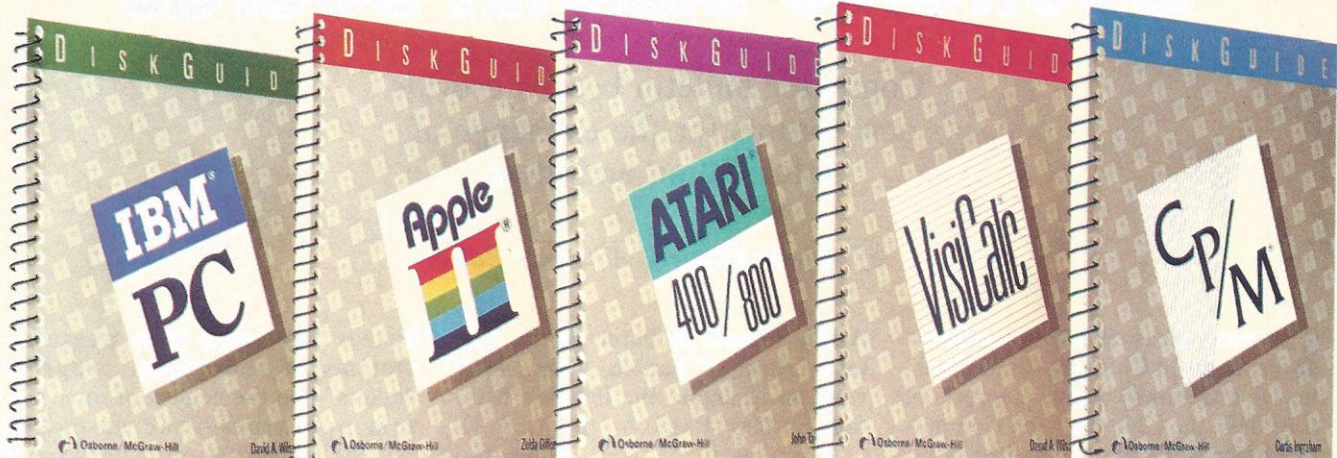
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Electronic Bulletin Boards

Computer bulletin boards provide
new forums for the exchange of
information and ideas

by Arielle Emmett, Associate Editor

Like most ideas, it began modestly. Probably in Chicago. Ward Christensen and Randy Suess, members of CACHE, the Chicago Area Computer Hobbyist Exchange, had been attending meetings and looking at the bulletin board where fellow hobbyists put up their messages, want ads, and small communications. It was a fairly mundane thing to do; it was a necessary thing to do. But like most necessary and mundane things, there was a question about it: Could it be done faster? Better? Was there, perhaps, an electronic equivalent of a bulletin board?

Christensen and Suess asked these questions in 1978, and from the answers created their long-running electronic bulletin board, CBBS/Chicago (Computerized Bulletin Board System/Chicago). Christensen, a self-described "hobbyist, hacker," won't say whether his and Suess's board was the first in the country. Certainly it was one of the first. But to be sure, other smart people were working on electronic mailing systems and bulletin board software around the same time. Among them were Ed Allen of Electronic Message System in Kansas City, Mo., Bill Abney, author of Forum-80 (one of the bulletin-board packages for the Radio Shack TRS-80 Models I and III), and software writers Craig Vaughn and Bill Blue, who wrote an earlier package for the Apple called

ABBS (Apple Bulletin Board System). Blue, of Santee, Calif., later went on to create the People's Message System (PMS) for the Apple II.

It was as if all these people had caught hold of an idea that was bigger than itself. According to Christensen, the timing was right, the hardware was there, and "the presence of the Hayes S-100 modem at the time made it very easy to detect a ringing telephone. I guess we realized there was enough hardware to put up a system that could be dialed into—an electronic analog of a bulletin board."

The first boards were done "super-market style": a short list of electronically posted notices and one-liners which provided vital statistics and no more. But now, with over 550 verified local electronic boards across the country (some estimates run higher than 1100); with fly-by-night operations and cowboy operations, sci-fi galactica and "heroic" sustaining boards providing hobbyist and community services and more—local bulletin boards have come into their own.

They defy old descriptions. They are part of evolving descriptions. The telecommunications revolution, along with the stamp of American personality and the software to meet the demands of both, have enabled the boards to be adapted to fit the most diverse needs. At the same time, the

boards have also been abused—victims of saboteurs, program "takers" and the neglect of some system operators—the so-called "sysops"—who are often unaware of the expense, effort, and time required to make a good bulletin board work.

What makes a good bulletin board?

Says PMS's author, Bill Blue, "It is electronic mail, but the difference is it's done in real time instead of being electronically packaged in advance." The user can add or remove messages at will, "interacting with the bulletin board as he goes—it's performed interactively between the caller and host computer."

Forum-80's Bill Abney, of Kansas City, Mo., adds, "I object to [the term] 'bulletin board system.' That's a limiting definition. A bulletin board is at your local grocery store—it's one-way communication. 'Forum' is a better description because it's two-way—rather than the posting of notices."

According to Jim Cambron, editor/publisher of *The On-Line Computer Telephone Directory* in Kansas City, Mo., a quarterly newsletter which reports on local bulletin boards and innovations in the field, the main difference to the user is cost. "If it's free access and there's absolutely no restriction other than crashing someone's system, it's a local bulletin board," he says. "If you

The electronic bulletin board is no longer the souped-up, computerized version of local laundromat listings.



pay, it's CompuServe" or The Source—referring to two national bulletin board systems offered by these leading data-base networks, both of which charge hourly subscriber rates for their services. (CompuServe's system is called National Bulletin Board; The Source's is called Post.)

Real-time message system

Whatever the preferred criteria—and most users would agree the above definitions have their merit—the electronic bulletin board is no longer the souped-up, computerized version

of local laundromat listings. Nor is it pure electronic mail. In essence, it's a message system functioning in real-time which allows the user, through a modem and terminal program on his own computer, to log on a "host" computer, get data, messages, and information, leave messages and data, upload and download programs, and then log off. The user, in effect, controls the host computer throughout this process although the flexibility and power of the system lies in the data base of the "host."

"A bulletin board has everything to do with how a data base is or-

ganized," explains Dean Gengle of San Francisco, co-author of a popular conferencing style software program known as the CommuniTree—First Edition. The structure of the data base may be linear, allowing users to sift through message after message in the listings. Or it can be "tree-like" (CommuniTree is an example), allowing the user to quickly access "root" messages and their derivatives, or "daughter," messages according to a desired subject category. Because of the increasing sophistication of most software programs, computers can now sustain

STARTING YOUR OWN BOARD: PLANNING AND SETTING UP

The best boards are well thought out in advance. Divide the task into steps, or phases, and give yourself enough time to carefully consider your choices of hardware, software, maintenance schedules, even the audience you want to reach.

Phase I: Defining your goals

What do you want to achieve with your bulletin board? Identify your prospective users. Will they be computer or non-computer oriented, or both? Will they demand a 24-hour system? Do you want to limit your callers through a password or cryptic sign-on system? How large will your data base be? Do you want a message capability only? A programs section? A conferencing-style board with long-message capability? Consider these questions before you choose your software.

Phase II: Doing Your Research—National vs. Local Boards

Both The Source and CompuServe offer extensive bulletin-board features you might want to consider carefully before investing in your own local board system. These include an electronic posting of national classified ads for goods, services, real estate, hardware/software, and many other items. The Source's special features include a "Chatter" group, which amounts to a fantasy-like message service in which subscribers log on under an alias, pretend to wage wars, conduct marriages,

romances, etc., like living storybook characters. Games are also a feature, as are file space and electronic mail services provided for like-interest groups (e.g., an Apple category). CompuServe offers 50 boards, known as "forums" for special interest groups, as well as its popular CB simulator, electronic mail, classified postings, and data bases in over 500 subject areas.

With all this, how do you decide if you still need a local board? As Rich Baker, a CompuServe spokesman puts it, "If a person needs a national audience [a national board] will be beneficial." But, he added, "As they are designed today, national boards don't focus on local issues." Another factor to consider is cost. In addition to hook-up fees, CompuServe and The Source charge hourly subscriber rates. The Source's daily rate per hour (7 a.m. to 6 p.m.) is \$20.75, its nightly rate (after 6 p.m.) is \$7.75. (Hook-up fee is \$100.) CompuServe's hourly rate is \$5.00, and the service offers various introductory hook-up packages through Radio Shack and other stores from \$19.95 to \$39.95. Consider both your projected expenditure and your aims for content and market when you decide which services—either national, or local, or some combination—are best for you.

Phase III: Surveying the Field

Uniform advice from the experts is that if you're contemplating a system, get in

touch with local users groups and people operating like systems. They'll provide information and shared experience. A wealth of printed information, though, can be obtained by reading the newsletter, *The On-Line Computer Telephone Directory*. (Write P.O. Box 10005, Kansas City, Mo. 64111, sub. price \$9.95 a year, \$15.95 for two years.) This contains an updated inventory of local bulletin boards around the country, including city location, type of software, and modem phone number, as well as articles and reviews on telecommunications trends, hardware, and "mini-user's-guides" to the most popular host software programs. Other excellent inventories and software information sources include Ed Gelb's Database System (201-694-7425); you can also obtain a photocopy of any of his .BBD files, including the handicapped directory, courtesy AMRAD, by sending 50 cents to 92 Hemlock Terrace, Wayne Township, N.J., 07470; CBBS/Chicago (312-545-8086), messages #9-11; PMS Santee (619-561-7277); Forum-80 Kansas City, Mo. (816-861-7040); Public Access Message Systems Charleston Network (304-345-8280); and CBBS/Lawrence (617-683-2119)—this is a board exchanging information on new computer applications in medicine.

Phase IV: Choosing Your Software Package

The true advertising and promotional potential of the electronic board has yet to be tapped.

long messages, respond to commands, preload commands, surrender to comments, newsletters, long articles, technical discussions and the like. In short, an electronic bulletin board can act "like an open newsletter in which people can comment on the items," Gengle says.

Tapping the potential

Currently, an estimated 30 to 40 percent of all electronic bulletin boards are used by business and commercial interests to aid in customer feedback and promote products and services—even such commodities as real estate

and movies. Nevertheless, the true advertising and promotional potential of the electronic board has yet to be tapped, according to PMS's Blue. "People don't really know what to do with it," he says. "They misinterpret its potential. In general, computer stores are the worst operations—they don't spend the time to interact with the callers."

An antidote to this problem seems to be broader education—how, indeed, do you use the thing? Answers, at least in part, may come from the dedicated hobbyists who are some of the most experienced users of bulletin

boards. Computer-user groups and individual system operators run more than 60 percent of the boards in the country, swapping information about hardware and software, discounted items, problems, and bugs. Many of the more imaginative users of electronic boards are emerging from groups whose primary purposes are not computer related. For example, in Columbus, Ohio, a network of science fiction enthusiasts regularly exchange the latest book and article reviews and club announcements through an electronic bulletin board called The Galactic Network. In An-

Whether you are purchasing hardware for the first time or deciding on your host software package, stick to a reputable dealer who has a lot of experience and can offer solid guarantees and excellent customer support, because you will have questions. *The On-Line Computer Telephone Directory* publishes lists of current packages available for different personal computer makes; several packages are available for some makes. Below, we highlight a few of the most versatile:

Forum-80: A single-user system written for TRS-80—Models I and III, (48k RAM), this package supports a hundred messages and up to four disks (5¼-inch floppies) at a time; 300 and 1200 baud rates. Bill Abney, creator of Forum-80, asserts this is a "more complicated" package than other bulletin-board software for the Radio Shack TRS-80. Features include a multiple command input structure which allows you to preload commands; the system has the capability of accepting an auto log-on string of up to 254 characters; this can save valuable time. Help, however, is available throughout the system at the input prompt, thus making it acceptable to both the beginning user and the expert, who may enter commands and proceed without delay for the printing of menus. The system also features a log of callers which can locate a previous caller in its file. Whole blocks of

text can be transmitted. Says Abney: "The most intriguing thing is how well it lends itself to commercial operation: Some good-size corporations are using it as a 'user' friendly system." Forum-80 is a machine language program written for speed and efficiency. (Abney offers Forum-80 at a reduced price of \$300; write Forum headquarters, 7600 E. 48th Terrace, Kansas City, Mo. 64129).

CBBS for the CP/M: Written by Christensen and Sues in 8080 Assembler, this program supports the board CBBS/Chicago and has logged more than 80,000 callers since 1978. The message capacity is 250, with over 11,000 lines of 8080 Assembler source for the file using a 64k dual-disk single-density system. An expert user mode shortens the prompts. While this system is primarily hobbyist oriented, it has been used by the National Bureau of Standards, the Smithsonian Institution, and others. Users must press the carriage return key multiple times for the CBBS to detect baud rate (110/300/450/600). Messages #9-11 are ordering messages on CBBS/Chicago (312-545-8086).

CommuniTree—First Edition San Francisco, Calif.: A bulletin board system for the Apple II, II+, IIe, and the Franklin Ace (48k). This conferencing-style program geared especially for non-computer uses can support from

one to six disks; its structure is "tree-like"; main headings come with subheadings to instruct the user, and the basic commands are Read, Index, and Browse. The program can display the entire text of the specified message along with a list of "daughter" messages. Forty to 50 same-subject messages can be accommodated in a single category, and the messages can be long—up to 50 lines of 80 characters, a capacity that lends itself to a "newsletter" type format. This program is written in FORTH, which runs roughly 10 times faster than BASIC. Beginners can learn the system in about 15 minutes; it can be adapted from public to private access to make group exchange easier. Baud rate: 300. For more information: (415) 849-2665.

People's Message System (PMS) for the Apple II (48k): This multilevel system can support one or more alternate message bases; actual message storage capacity depends on disk space, features extra prompting for the first-time caller, but can offer the seasoned user shortcuts. The program allows you to define commands which will tell the computer to ready any disk file, as contrasted with some other programs which follow a much more regimented command structure. Bill Blue, the program's author, asserts that "It's been a constant phenomenon. People switch to PMS and get at least triple the users."

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“The whole idea of a bulletin board is communication.”

HOME

dover, Mass., internist Dr. Matthew Cushing has set up a local board to exchange information on new computer applications in medicine. In Wayne, N.J., a team of system operators, Edward Gelb and Peter Keller, now collect and print lists of teletype systems for the mute, deaf, and physically disabled to help them access quick information about employment and services. And in Marin County, Calif., a coalition called MariNet is attempting to set up a “micromedia town hall” using a conference tree program with bulletin board capabilities. According to coordinator Maryjane Dunstan, the aim of the project is to link the unincorporated communities in Marin County and provide a form of “participatory democracy”—to let them speak out on issues and future policies, and to set up a “real dialogue” between community members. Dunstan says she is hoping to gain the cooperation of local computer store dealers in providing free public access to terminals and thus to the bulletin board.

Limitations

Free access, public access—the buzzwords describe the phenomenon but don’t speak to its limitations. Software packages for the major brands of personal computers may run from free for a CP/M public domain package to \$300 and more for bulletin board systems like People’s Message System and Forum-80 (see sidebar on page 66). Edward Gelb, who wrote his own bulletin board software program for his two Heath 89 computers, says he spent \$5500 for the original hardware, plus the additional cost of a dedicated phone line to the computers—a necessity for a system operator running a bulletin board on line 24 hours a day. He could justify the costs because his work in marketing management required his computers to shuttle data back and forth. Still, he admits, that’s a large cost for the average

system operator to stomach.

John Buckley, a system operator in Belpre, Ohio, might well agree. While Buckley did not sink anywhere near \$5500 into his original Commodore PET 4032 and his 4040 disk drive, he did find that running a bulletin-board system was an exercise in unexpected expense. There was the \$94 setup cost of the dedicated phone line he had not counted on. His bulletin-board system package from Commodore Ltd., in Toronto cost him \$200. Also, he discovered, any operational system must sustain the necessary cost of an auto-answer modem, plus interface equipment such as a communications card or RS-232 port to allow the computer to transmit data over the phone line. The Commodore model has such equipment built in. In all, Buckley’s setup cost was over \$400. This cost, of course, did not include the late-night hours and sweat he and other electronically minded friends expended in “debugging” the system which, he admits, suffered from “incomplete documentation.” Author of the program, Steve Punter, says he was dissatisfied with Commodore’s handling of the package and he is now distributing it himself. For information, write to him at 1343 Tyneburn Crescent, Mississauga, Ont., Canada L4X1P6.


Just how long the novelty lasts for Buckley’s or any other small electronic board across the country is anyone’s guess. Some experts, among them Gelb and Cambron, worry that the boards may be a self-limiting phenomenon, the victim of frivolous usage and the as yet scant use of telecommunications which, Gelb says, is still in its embryonic stage. “There are not enough modems out there yet,” Gelb declares. In 1982, roughly 15 percent of personal-computer owners also bought modems, a small increase of 3 percent over 1981, he reports. While that will likely change, a mood of selfishness and toying, even abuse, may not.

These days, Cambron says, a system operator has to have “a thick skin.” He cites cases of juveniles literally “breaking” bulletin boards—cracking special codes, damaging the computer, wiping out disks; even the lesser offenses of the “takers” who write irate and even obscene messages to the system operator, protesting the trend toward “password” access to the download sections of boards—a trend fostered largely by the habits of takers themselves.

The end of free access?

The result may be that the so-called free-access board will one day cease to exist—a casualty, Cambron suggests with irony, of the generous two-way structure of the data base which made it so popular in the first place. Already the bulletin boards offering use-restriction techniques are fast becoming some of the most popular packages. Examples are Net-works software for the Apple II or Franklin 100, as well as Forum-80, both of which require the user to apply for a password in order to access the section of the board from which users download data, programs, and text.

If this seems a regrettable trend in affairs, it should also serve as an important signal to new or would-be system operators who would like to see the local board survive. Perhaps they should take a cue from “old-timers” like Edward Gelb, whose two boards run with Peter Keller have logged more than 10,000 callers in the past eight months. Gelb is stalwart in his assertion that boards ought to provide needed services to people—be they lists of services for the handicapped or other groups, or simply pure research for the computer buff.

“The whole idea of a bulletin board is communication,” he says, “like the time you went to school to put up a board—it has to be selfless. The board is not to make you a hero; it’s giving you personal satisfaction. But it’s got to be contributive.” 

True Electronic Mail

You can't buy true electronic mail today.
But, depending on how you define it,
you can make it yourself

by David Gabel, Senior Editor

When I want to mail a letter, I follow a very simple procedure. I seal the letter, put a stamp on it, address the envelope, go out to the mail box in front of my house, put the letter in, raise the flag on the mail box, and I'm done. People who live in the city have more of a problem—they have to walk to the corner mail box. In either case, the simple act of inserting the letter into the mail box completes the interface with the Postal Service, and the next thing you know, the letter is delivered to the addressee.

Electronic mail should be at least that easy to use. Unfortunately, it isn't. Suppose you want to send a letter to your friend across the country. Is it as easy to send it by computer as it is to send it through the mail? The answer is "No." Most people today have to either subscribe to an on-line service to send and receive electronic mail, or they have to buy hardware and software over and above the normal complement of a personal-computer user. If they subscribe to a service, they can only communicate with other subscribers of that service. If they buy the additional hardware and software, the cost is difficult to justify unless message volumes are very high or electronic mail is to be one of many things done with a personal computer.

You can create your own system, though. We've made a first attempt

at *Personal Computing*, and the system works, although it has a long way to go before it's what we would call true electronic mail.

As it turns out, the system is relatively easy to set up. What's required is a problem definition, a step-by-step synthesis of the solution, and then implementation of the steps of the solution.

The germ of the idea

We started thinking about the solution when the problem jumped up and bit us at the magazine. First of all, we have offices on both the East and West Coasts. These offices regularly exchange messages, some of which can be as long as 5000 words. Of course, we have to have someone at each office, manning the computers, to make that work. When information is ready to be sent, someone at the receiving end has to stop whatever he's doing, prepare a computer for data reception, and then wait while the information is being captured. Then, depending on the software used, the person may have to save the resulting text buffer to disk before returning to his normal activities. It takes time, and it's a bother.

It would be great, we figured, if we could do all this at night, when the computers aren't in use. There are ways it could be done off-the-shelf. If we used Transend III, a new product from SSM Microcomputer Products

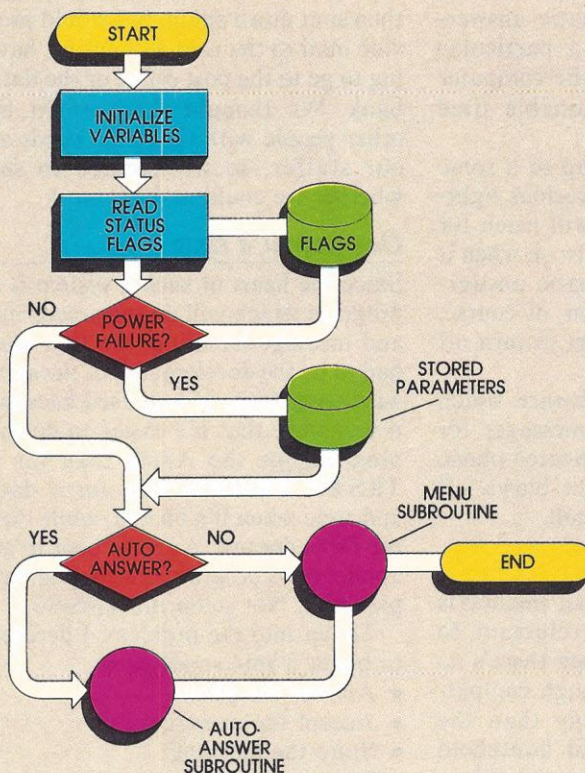
in San Jose, Calif., we could leave our computer powered up—and the monitor turned off—with the package running, and it would receive incoming messages and store them in a "mail box." When we arrived in the office in the morning, we would simply call up our mail and read it. Or, we could install the Microcom Professional Communications System, a modem with an integral 64k buffer which will receive data with the computer turned off and store it until it's called for.

We've bypassed both these options, for reasons too numerous, and probably too frivolous, to mention here. In the meantime, another dimension of the problem surfaced.

One of our staff members has something of a split personality. Most of the time he's a city dweller, with an apartment in Manhattan. But on weekends, he's a country gentleman in his house on the east end of Long Island. Occasionally he'd like to work from his country house and mail the results of his work to his TRS-80 computer in Manhattan. The computers in the two locations have incompatible disk formats, so he can't carry a floppy disk from one place to the other. He could get a bulletin-board program and use that by himself, but then if a friend calls he'll be greeted by the ear-splitting whoop of a modem carrier. Is there another way?

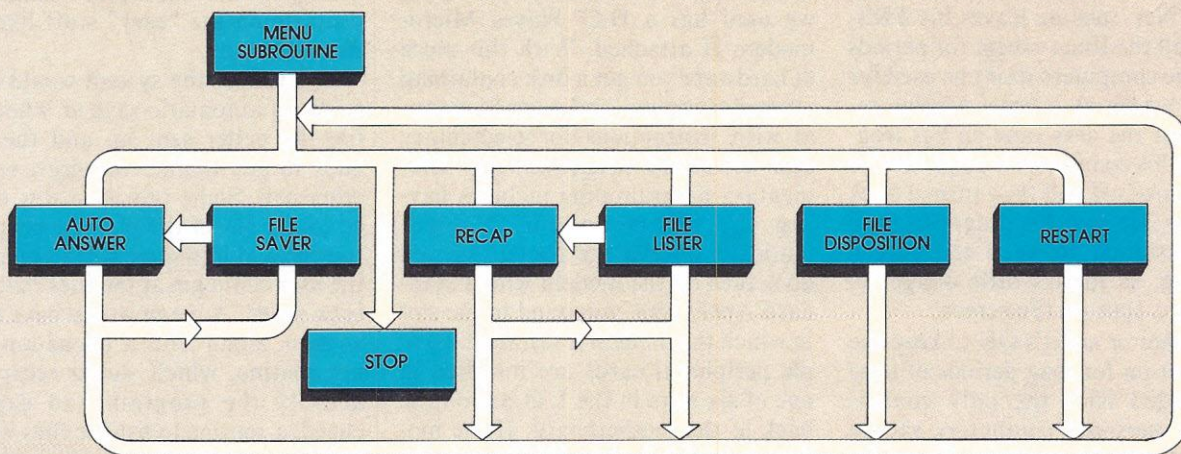
*We send messages, which
can be as long as 5000 words,
between the offices regularly.*

MAIN PROGRAM



PROGRAM INTERACTIONS

FIGURE 1



As we talked about other ways, possible solutions began to take shape:

- Put the computer on a timer so it will boot up an automatic answer-and-store program at a particular time. Set the timer so the computer turns off after a reasonable time interval.
- Hook the computer up to a sonic switch, available from various lighting stores. The switch will listen for the phone to ring and turn on when it does, booting an automatic answer-and-store program. Then, of course, it has to figure out when to turn off again.
- Use bulletin-board software, which can receive and store messages for later pickup, with a dedicated phone line so friends don't get blown off their chairs when they call.

Personal problem

The problem with the last method is that some people are reluctant to leave a computer on when there's no one in the house. Although computers dissipate less energy than the average light bulb, and household circuits are carefully protected to prevent fire, some people think computers shouldn't be left alone with the power on. This is by no means a universal opinion. Lance Miklus, who runs his own bulletin board called Mouse Net, says he leaves his TRS-80s on all the time, except for periods when the computers won't be used for several weeks at a time. Miklus reports that the only time he has trouble with his computers is after they've been turned off and then turned back on again. He says his programs have been designed to keep the screen changing, so there's little danger of burning a spot on the screen.

Whether or not it's OK to keep the computer on for long periods of time unattended isn't the only consideration; personal computers should above all else be personal. So we focused our attention on the other two possibilities, which might result in a

system we could define as true electronic mail. Such a system would be quiescent until called upon, would accept and store mail when accessed, then shut down again, but would provide mail to the user without his having to go to the post office or the data bank. We thought there might be other people with the same needs as our staffer, so we decided to see whether we could make it work.

One step at a time

Since the heart of such a system is a program which will do the answering and message handling, the first step had to be the development of the software. An Apple II was used because it turns out that it's easier to do the program for the Apple than for a TRS-80. TRSDOS asks for a date and time when it's booted, while Apple DOS doesn't. An auto boot to an applications program is a snap in Apple DOS. Not so on the TRS-80.

To get into the problem, I decided to break it into small parts:

- Answer the phone;
- Accept the message;
- Store the message;
- Start over;
- Drop out of loop when queried;
- Display received messages for user action.

Answering the phone was the hardest part. Fortunately, the Apple we used has a D.C. Hayes Micromodem II attached. With this piece of hardware you get a disk containing several programs, and a user's manual with instructions for elementary and advanced programming. Elementary programming includes having the Micromodem II automatically answer the phone. All you do is turn on the modem with a standard Apple IN# command to the slot in which the modem is installed. (Apple peripheral cards are installed in one of six slots in the I/O bus on the back of the motherboard. If the modem is in slot 2, then IN#2 turns the modem on for input.) An INPUT command is given from Applesoft

BASIC and the modem takes control of the computer until the phone rings. When the ring comes, the modem sends out its carrier and issues a RETURN to the computer, which terminates the INPUT statement and allows the program to continue.

The following code accomplishes phone answering with my hardware configuration:

```
10 D$=CHR$(4)
20 PRINT D$;"IN#2"
30 INPUT A$
40 More program statements
50
60
```

Line 10 stuffs a CTRL-D into the variable D\$. When Applesoft prints D\$ it knows the next thing it prints is to be run through DOS, so normal I/O won't be disconnected. The IN#2 command initializes the Micromodem for input, and the INPUT command tells the computer to wait for a character. When the modem sends the RETURN after the phone rings, the INPUT statement is ended and the computer can go on executing the program. If the phone doesn't ring, the program waits at statement 30.

That wasn't so hard

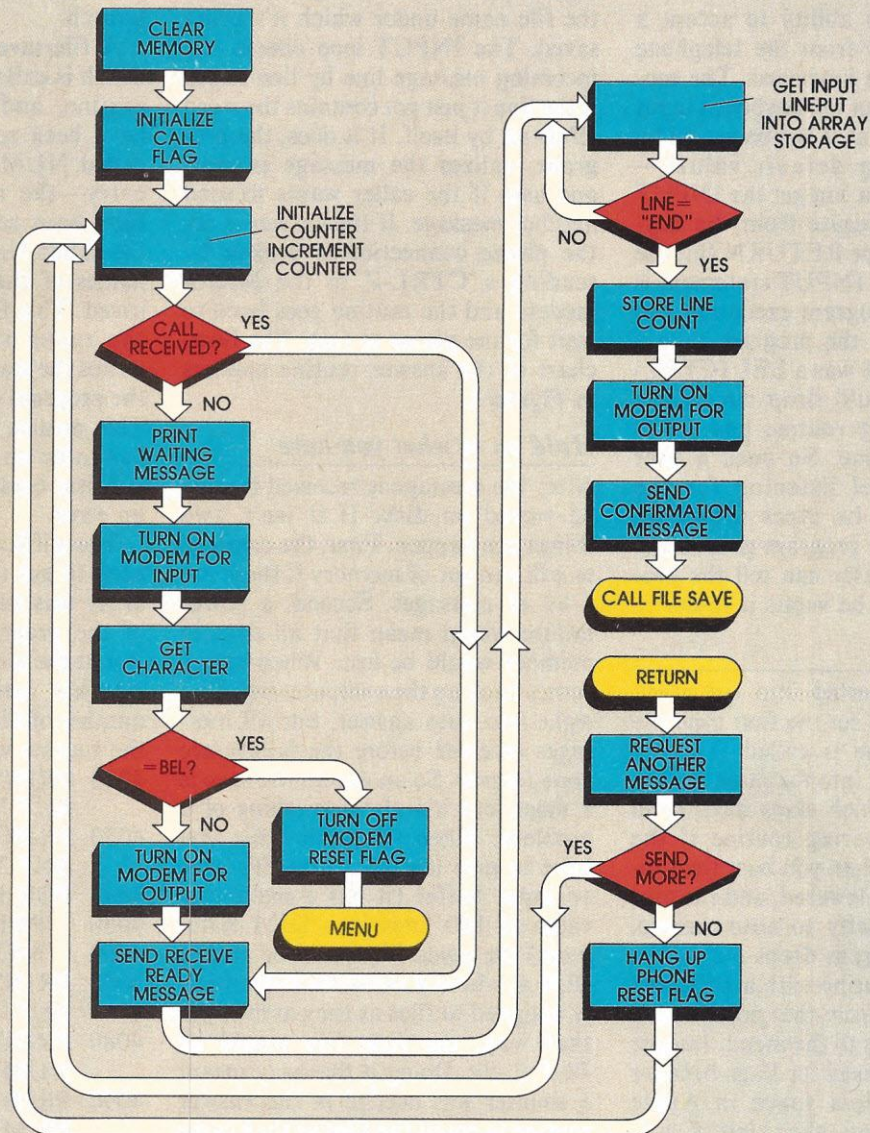
Finding that little program fragment in the manual was a major breakthrough because it meant I could concentrate on the "easy" stuff like file maintenance.

The rest of the system would have to do an automatic save of whatever file the caller sent in, and then go back to get another message, or another call. Some provision was needed to get out of the phone-answering routine and into some sort of menu so the user could get at the files that had been saved. A menu would have to be written, along with a phone-answering routine, which would recap the activity the program had experienced, a routine to list the files which had been received, and one to delete files no longer needed, as well as a file-save routine.

*Personal computers should
above all else be personal,
shouldn't they?*

ANSWER ROUTINE

FIGURE 2



The next step was to do a rough flow chart of the whole system, showing the interactions required. It appears as Figure 1. The next problem was to figure out how to do the rest of the phone routine.

One of the fortuitous things about the firmware which drives the Micro-modem II is its ability to accept a character either from the telephone line or from the keyboard. The modem will intercept the keyboard input and deal with it as it has been told by the initializing default values—which means you can get the INPUT statement to execute from the keyboard. If you type RETURN (hit the return key), the INPUT statement is satisfied and program execution will continue. I told the program that if the character A\$ was a BEL (CTRL-G) then it should drop out of the phone-answering routine and go to the menu routine. So once a user wants to cancel listening for the phone to ring, he types CTRL-G, RETURN. The program goes to the menu and the user can tell the program what else he wants it to do.

Raise the flag

A flag was inserted into the menu routine which is set the first time the menu subroutine is called. Then, a statement is put into the main part of the program which skips directly to the phone-answering routine if the flag isn't set. When you boot the program the flag is lowered, and the program goes directly to auto answer. When the program drops out of the auto-answer routine with a BEL, the flag is set, and from that point on the program returns to the menu. Integer variables were used for flags because they take up less space in Apple memory than any other kind of variable (four bytes). You can check a flag in Applesoft with the simple IF statement, IF F5% THEN . . . , or IF NOT F5%, THEN . . . The IF is true if F5%=1, false if F5%=0. Other BASICs should work in a similar fashion.

The rest of the auto-answer routine is an INPUT loop, which keeps looking for lines from the modem. Of course, there's a message sent to the calling party telling him to send his message, and one at message termination that tells the caller the message is in, that it's being saved, and the file name under which it's being saved. The INPUT loop checks the incoming message line by line to see if the line it just got contains the word END all by itself. If it does, the program realizes the message is over, and asks if the caller wants to send another message. If the answer is no, the phone connection is broken by sending a CTRL-Z to the Micro-modem and the routine goes back to wait for the phone to ring. The flow-chart of the answer routine appears in Figure 2.

Hold on to what you have

After the message is received it must be stored on disk. If it isn't, two things can happen. First, the computer will run out of memory if there are a lot of messages. Second, a power failure would mean that all data in memory would be lost. When power comes back up the computer will boot right into auto answer, but all messages received before the failure are gone forever. So an automatic save is a must, but it's also something of a problem. When you save a file you have to give it a file name. To save an input buffer (it has a maximum value of 100 lines in a DIM statement) the saved file would be named BUF.#, where # would be sequentially assigned to files as they arrived. In that way, the first file would be BUF.1, etc. Doing it that way meant a counter was needed in the answer routine to count the files as they came in, which would be incremented when the computer began to get another file.

It also meant that when a file was saved, another file would have to be saved that would record the message counter. In addition, another file

would be necessary for file names, so the program could tell its user what files had been saved, as well as a file for the number of lines in a file. Finally, a status-flag file had to be added so that when the program booted it could tell if it was booting after a power failure or booting from scratch.

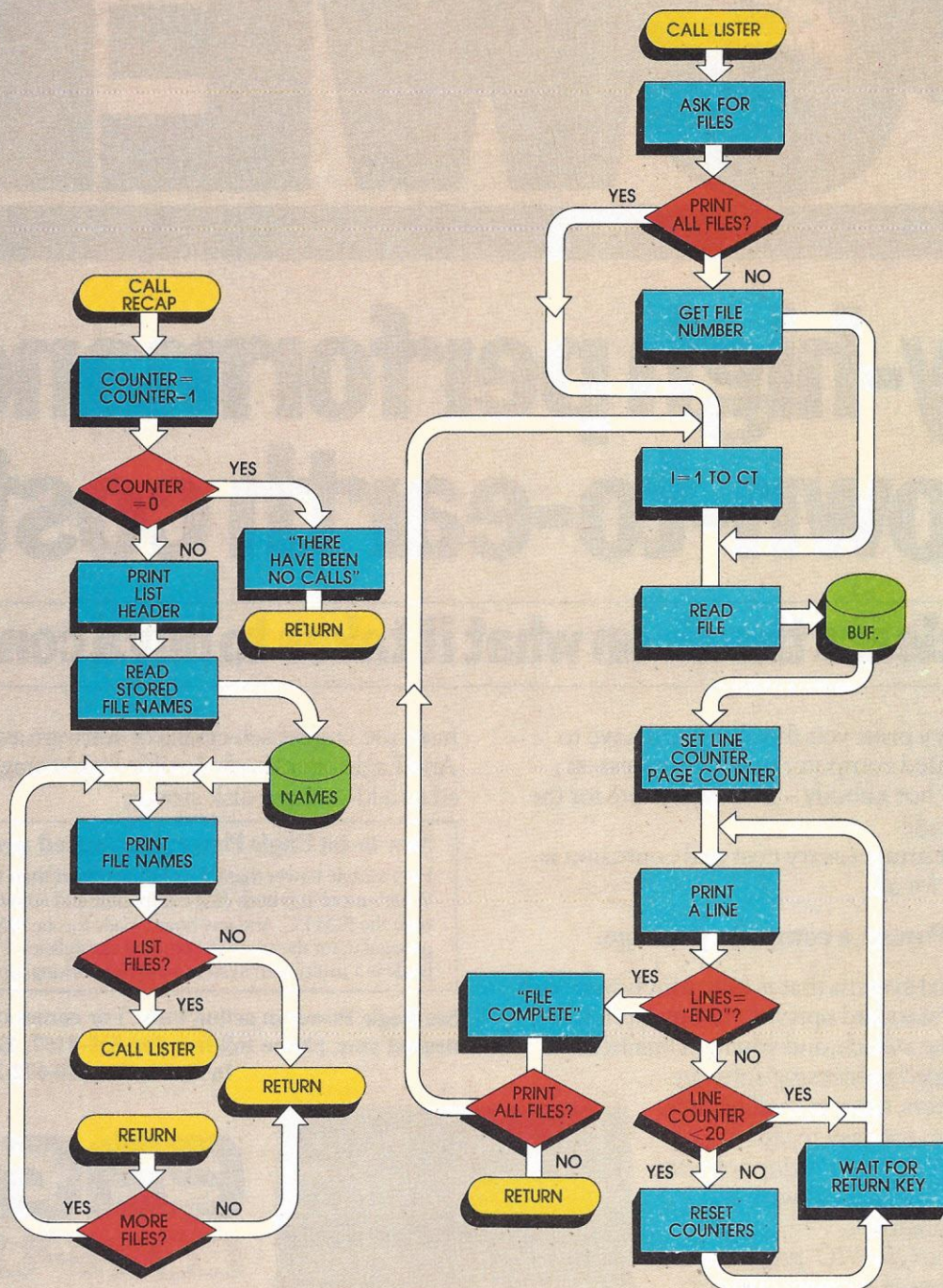
A file-save routine was developed which is called from the auto-answer routine, and saves the files which have been received. It writes a file called NUMBER that has only one entry—the number of calls which have been received. It also writes a file called NAMES that contains the names of the files which have been saved. This file is used to list files in the recap subroutine. Finally, it writes the status-flag file, FLAGS, so the program can read it after booting. This means, of course, that FLAGS has to be on the program disk when it's first booted, or else there will be an error.

The difficult part of this was the need to get the right file names. An array was declared at the beginning of the program called NL% which stored the number of lines in the file. Another variable, CT, counted the number of files. With these variables, the routine was written as follows:

```
4020 PRINT D$; "OPEN
      BUF.";CT$
4030 PRINT D$;"WRITE
      BUF.";CT$
4040 FOR I = 1 to NL%(CT)
4050   PRINT LN$(I)
4060   NEXT
4070 PRINT D$;"CLOSE
      BUF.";CT$
4080 PRINT D$;"OPEN
      NUMBER"
4090 PRINT D$;"WRITE
      NUMBER"
4100 PRINT CT$
4110 PRINT D$;"CLOSE
      NUMBER"
4120 IF CT < > 1 THEN 4140
4130 PRINT D$;"OPEN
      NAMES":
      GOTO4150
```


My next step was to do a rough flowchart of the system, showing all the interactions.

ACTIVITY RECAP & FILE LISTER
FIGURE 3



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```
4140 PRINT D$;"APPEND
      NAMES"
4150 PRINT D$;"WRITE
      NAMES"
4160 PRINT "BUF.";CT$
4170 PRINT D$;"CLOSE
      NAMES"
4180 PRINT D$;"OPEN FLAGS"
4190 PRINT D$;"WRITE
      FLAGS"
4200 PRINT F1%:
      PRINT F2%:
      PRINT F3%:
      PRINT F4%:
      PRINT F5%
4210 PRINT D$;"CLOSE
      FLAGS"
4220 IF CT < > 1 THEN 4240
4230 PRINT D$;"OPEN
      LENGTH":
      GOTO 4250
4240 PRINT D$;"APPEND
      LENGTH"
4250 PRINT D$;"WRITE
      LENGTH"
4260 PRINT NL%(CT)
4270 PRINT D$;"CLOSE
      LENGTH"
4490 RETURN
```

The next part of the project had to be the activity-recap routine, and then the file-listing routine. The first of these calls the second, so when the user wants to see what files have been received, RECAP tells him, and then asks if he wants to look at the files. If he says yes, RECAP calls LISTER which requests the file name for listing. You can also get to the listing routine directly, in those cases where you already know what files are saved, and just want to look at one of them.

When the listing routine was run, a problem surfaced. Computers list at an infuriatingly fast pace. If you have a file that's longer than one screen, the file scrolls so fast you can't read it. To overcome that, the routine was set to list 24 lines at a time, and wait for the user to request more by hitting RETURN. Flowcharts for RECAP and LISTER are shown in Figure 3.

Those were the basic parts of the

system but there were others—a file-delete routine which wipes out everything in preparation for a new answering session, a rerun option that sets all flags, arrays, counters etc. to 0 and starts over, and an ending routine which, as a precaution, closes any open files on the disk, prints an ending message, and stops.

Work in progress

The system still has bugs in it. The first one results from the Applesoft INPUT command. INPUT ignores anything on a line after it detects a comma.

The next problem is speed. All the program testing involved keyboard input which is slow, so Applesoft had no problem keeping up with it. It seemed likely that when the program was operating at data-transfer speeds, it would lose characters. What to do?

The answer is to write an assembly-language routine to pick up the characters. George McClelland, of Southeastern Software, one of the authors of Data Capture, a terminal program for the Apple, says the first version of that program was written all in BASIC, and it dropped characters. So another programmer at the company wrote an assembly routine that performs a polling function. It checks the keyboard for input, then checks the modem. If either has a character ready for input, the routine stores the character and goes back to polling. Some characters, ESC and in some situations RETURN, signal Data Capture to return to its menu, which it will do after receiving these characters.

Data Capture was taken off the disk by listing, which is easy because it's stored in an Applesoft program. McClelland says the company did that purposely, because it believes software should be available for a user's own purposes. Of course, Southeastern doesn't want to see pirated copies of Data Capture sold. But owners can modify it for special

applications—for their own use.


It didn't take long to see that modifying Data Capture probably wasn't the answer. It doesn't have the automatic save which was necessary. There would be other modifications required, too. Finally, to do this project the way the definition of true electronic mail called for, would have required making it run in other BASIC which would have been a monumental job working with a published program, even if the author did say it was OK.

The only solution was an assembler routine which is still in the works. Once it's running, the system will operate at high speed without dropping characters, accept input lines past commas, and take lowercase letters using a Videx 80-column board.

We haven't touched the hardware part of this project yet—making the computer turn itself on and off. That's going to be a tougher nut to crack, because depending on how you do it, it could involve tapping into FCC-approved and specified phone lines. It also involves switching 110V, which computers don't like. We'll see how this part of the project evolves, and let you know in future issues.

While developing the software part of this system has been a good experience, it's far from over. The software hasn't been through any kind of rigorous testing. We've only been able to establish that it works. We don't know that it works in all circumstances. For these reasons, we won't provide listings of this software.

This kind of system isn't for everyone. It has, at least in McClelland's opinion, limited application. Most people, he contends, will be quite satisfied with using The Source, or some other in-between medium, for temporary storage to accomplish what we're getting at with our true electronic mail.

While that's certainly one way of looking at it, if you want to try this idea we've presented, be our guest. After all, it's your computer. 

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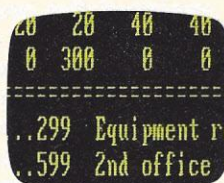


Photo of actual-size characters on Apple Monitor III.

your newspaper! And you can differentiate those characters in several modes: normal (white on black), inverse (black on white), bright intensity and dim intensity.

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Networking The Workplace

Local area networks create efficient computing circles where information and software are freely shared

by Jeffrey Rothfeder

The use of many personal computers in a single corporate site—be it a small business or a multinational firm—carries with it potential complications. How can technical economies of scale be assured; and how can the computers be used to their fullest so that software and data sharing as well as open communications among users are achieved?

There is a relatively simple solution: Build a local area network (LAN) that connects the computers and peripherals to each other in a kind of daisy chain. Developing a LAN isn't as labyrinthine a project as one might imagine—yet to those just wading into computing—recent initiates who might still be experiencing justifiable pride at cutting through the intricacies of their per-

sonal computer and its documentation—the thought of tackling yet another baggage-filled acronym seems fraught with peril.

But people who have taken the time to sort through the buzzwords and technical terms attached to the local area network field have found that five or 10 or 40 computers can, indeed, be made to speak to each other efficiently, as well as share common information, massive storage vaults, and peripheral devices. The result of a well-planned local area network is a monetary saving for the corporation because of increased departmental efficiency, better informed individual managers, and less down-time on printers, disk drives, and modems.

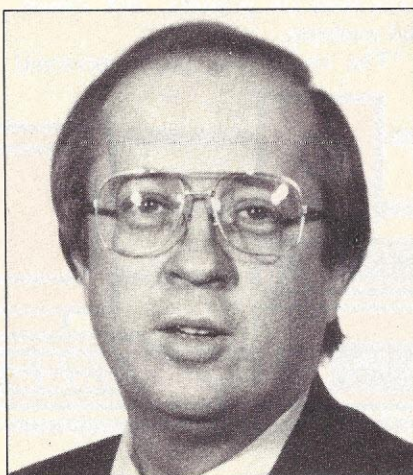
"The reason you buy a personal

computer in the first place," says Ted Boutacoff, director of systems services at Coherent, Inc., a Palo Alto-based laser manufacturer, "is to become more productive. And the way to become more productive in any given corporate situation is to share resources, whether creative or technical. In like fashion, sharing data is a major part of sharing resources. Data well used is worth money to a firm and the only way to share personal computing data efficiently is to hook the computers together by a local area network." For the past year, Coherent has had an in-place network, Omninet, on which cost accounts, mailing lists, a data base, graphics, and corporate financial consolidations (including budgeting and forecasting) are kept.





"With the personal computer you add power to your system each time you enhance the network."—Jim Pritchett



"A network can carry a corporation over a wide measure of its paper-boggled past."—Charles Vamossy

Most LAN users echo Boutacoff. "A local area network is like having a mainframe but also having a tremendous amount of flexibility," says Charles Vamossy, assistant vice president of advanced office systems at Merrill Lynch Pierce Fenner and Smith in New York City. In 1977 Vamossy became one of the first personal computer LAN users in the United States when he set up a network called ARCnet as a beta test while he was at CitiBank. Now Vamossy is responsible for Merrill Lynch's wide-ranging use of networking at its nationwide regional operation centers.

In its simplest form, a local area network is an organized data communications system that lets microprocessor-based equipment—computers, printers, disk drives, modems, and video hardware—interact with each other; it is an unbroken computing circle.

While there are variations, the basic LAN includes five components—the hardware made up of computers and peripherals; the network interface, which is usually an expansion card that plugs into the hardware; the network master controller, which is either a chip on the expansion card, a hard disk drive, or a dedicated computer; the network server, usually a hard disk drive that carries both the software that fuels the LAN specifically and the programs available to network users; and the wiring.

The intelligence of the network is

The master controller routes data between hardware and detects binary collisions.

in its master controller. This is the brain which acts as a traffic manager to route data between the hardware and, most importantly, to detect and prevent any binary collisions. For example, the master controller may hold up data that one computer is sending to a printer, for instance, because another computer on the network has already asked for printer time.

The personal computer local area networks most often used are made by Corvus Systems, Inc. of San Jose, Calif. and Nestar Systems, Inc. of Palo Alto, Calif. There are over 5000 Corvus Constellation and Omninet and close to 1000 Nestar Cluster/One and Plan 4000 LANs in operation today. Less widespread, but still in the running are ARCnet from Datapoint Corporation of San Antonio, Texas, Ethernet from Xerox Corporation of Dallas, Texas and HiNet from Digital Microsystems, Inc. of Oakland, Calif. (See sidebar on this page.)

Making LANs work

Though it may seem an unlikely site, the cardiology department at Los Robles Regional Medical Center in Thousand Oaks, California, runs one of the best local area networks in the country. The department has always had a good reputation as an intelligent care unit, whose staff takes pains to keep up with the latest instrumentation, equipment, and developments in the heart health care

SOME POPULAR NETWORKS

OMNINET
Corvus Systems, Inc.
2029 O'Toole Ave.
San Jose, CA 95131
(408) 946-7700

Compatible computers: Corvus concept, Apple II, IBM Personal Computer, DEC LSI-11, TI Professional.

Prices: Interface card, \$495; Network file server (with 18-Mb drive, \$4385.

Omninet links up to 64 workstations over a maximum distance of 4000 feet using twisted-pair wiring. The computer and peripheral interface cards contain a transporter or network master controller chip. The software server is attached to a hard disk drive. Disparate computers on the network cannot communicate with each other.

PLAN 4000
Nestar Systems, Inc.
2585 E. Bayshore Rd.
Palo Alto, CA 94303
(415) 493-2223

Compatible computers: Apple II, Apple III, IBM Personal Computer.

Prices: Interface card, \$595; Network file server (with 60-Mb drive), \$22,700.

PLAN 4000 links up to 64 workstations over a distance of up to four miles using baseband coaxial cable. The computer and peripheral interface cards contain an intelligent chip—called Resource Interface Module (RIM)—to serve as the network master controller. The network file server is attached to a hard disk drive.

ARCNET
Datapoint Corporation
9725 Datapoint Dr.
San Antonio, TX 78284
(512) 699-7000

Compatible computers: Datapoint

Prices: Interface card, \$495; Network file server (with 10-Mb drive), \$10,000.

ARCnet links up to 255 computers over a distance of up to four miles using baseband coaxial cables. The interface card contains the same intelligent chip—the RIM—as the one used in Nestar's PLAN 4000. The network file server is attached to a hard disk drive. Tandy Corporation has announced that it plans to have its Radio Shack Model 16 and Model II computers support ARCnet by the end of the year.

ETHERNET
Xerox Corporation
6416 Wrenchwood Rd.
Dallas, TX 75252
(214) 689-6045

Ethernet is an attempt to create a universal networking standard for computers. It is a coaxial baseband bus network that will hook up 1024 workstations over a distance of 2.5 kilometers. Its architecture and topology is not proprietary so separate distributors sell Ethernet-compatible products. One example is:

ETHERSHARE
3Com Corporation
1390 Shorebird Way
Mountain View, CA 94043
(415) 961-9602

Compatible computers: IBM Personal Computer, Apples by late 1983.

Prices: Interface card, \$950; Network file server (with 10-Mb drive), \$11,500.

EtherShare and all other 3Com products operate on the Ethernet network. An intelligent chip is connected to the interface card to manage the network. The file server, if a hard disk drive is not chosen, can also be a dedicated computer.

APPLENET
Apple Corporation
20525 Mariani Ave.
Cupertino, CA 95014
(408) 996-1010

Compatible computers: All Apple Computers.

Prices: Interface card, \$500; Network file server, price to be announced.

Apple Net is just reaching market. It can accommodate workstations over a distance of 8000 feet in a bus configuration.

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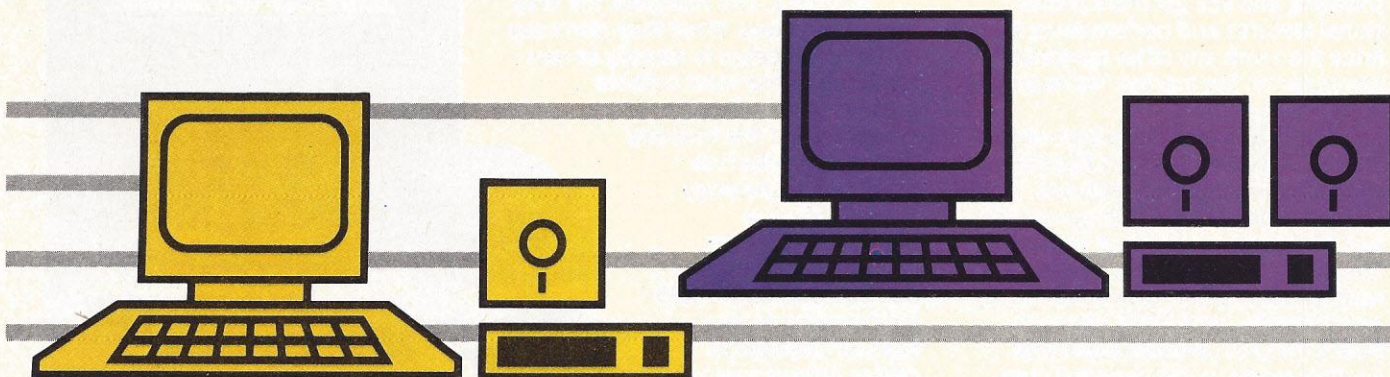
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Los Robles's LAN is an elegant network that expands the power of personal computing.

**PROFESSIONAL/
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field. Now, though, its achievements go beyond clinical prowess. The unit recently networked a series of seven IBM Personal Computers, representing another step in forward thinking that is helping patients, clinicians, and doctors.

When the administrators at Los Robles budgeted \$148,000 for high-tech equipment early last year, building a local area network was the last thing on their minds. They intended to buy a Honeywell cardiac catheterization recorder to monitor patient response to tubes implanted in the arteries. They felt the price was too high for the instrument's limited data crunching capabilities and decided instead to purchase a cheaper \$65,000 cath recorder. With \$83,000 in excess available funds, hospital officials began to look around for another need to fill.

"It was at that time that we saw an ad describing the Nestar local area network and it didn't take us long to figure out ways in which we could use a network in our unit," says Rick Porterfield, chief technologist at the Los Robles cardiology department. "We learned we could fantasize about fulfilling our needs and somehow as we built up the architecture of the network our fantasies kept becoming realities."

The unit's LAN—a Nestar PLAN 4000—took six months to design and includes a computer in the cardiology office, the cath lab, the technician's office, the vascular lab, and one in

each of the three doctors' offices.

Porterfield describes how the various network workstations use their computers: "The cardiology office runs the patients' information file; the cath lab computer takes the information from the cath recorder and does physiological calculations and keeps an inventory of supplies; the technician's computer—that's mine—is used for word processing, spreadsheeting, and keeping personnel records; and the vascular lab computer keeps a patient data base. In terms of the doctors' offices we have an interesting situation, because the three doctors are private physicians—not employees of the hospital—who keep their offices at our center and are available to us. They use their IBMs to maintain their billing and insurance records, to keep their patient data base, for correspondence with word processing, and as a means of hooking into the cardiology office's data base should they be caring for a patient in our unit."

Supporting the LAN is the 137 Mbyte hard disk drive which keeps all the software—the data-base manager, the word processor, the spreadsheet program, and the network operations program—that each workstation can call up.

Hooking up Plan 4000 wasn't difficult, even for computer neophytes like Porterfield and his crew. They simply plugged the network interface card into the peripheral slot of each

IBM computer and the peripherals on the LAN and ran common base-band coaxial wiring between the machines. Separate "intelligent" chips called RIMs—resource interface modules—located on each interface card serve as the master controllers for the network, and the network server attached to the hard disk drive manages the shared programs and data and the network software.

Like a well-played chess game

At Los Robles, the local network is constantly flashing data back and forth between users. The information flow possibilities are as open as the variations in a well-played chess game. The doctors, for instance, will be able to tie into the data-base software before making their rounds. The program will be loaded into their computers, and they'll type in their patients' names. The screen will display a complete patient record, including up-to-the-second readings from the computers in the catheter and vascular laboratories. The doctors can then print out the data-base information, ask to be tied into the word-processing software and make updated notes based on the patient data just received.

Los Robles is local area networking at its best—an elegant, simple architecture that expands the power of personal computing. Each user in the network has access to a wide array of data and programs which enable him to manipulate the data in any way.

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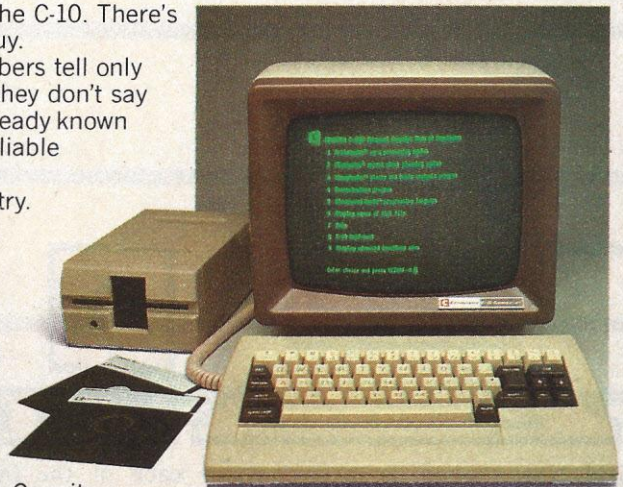
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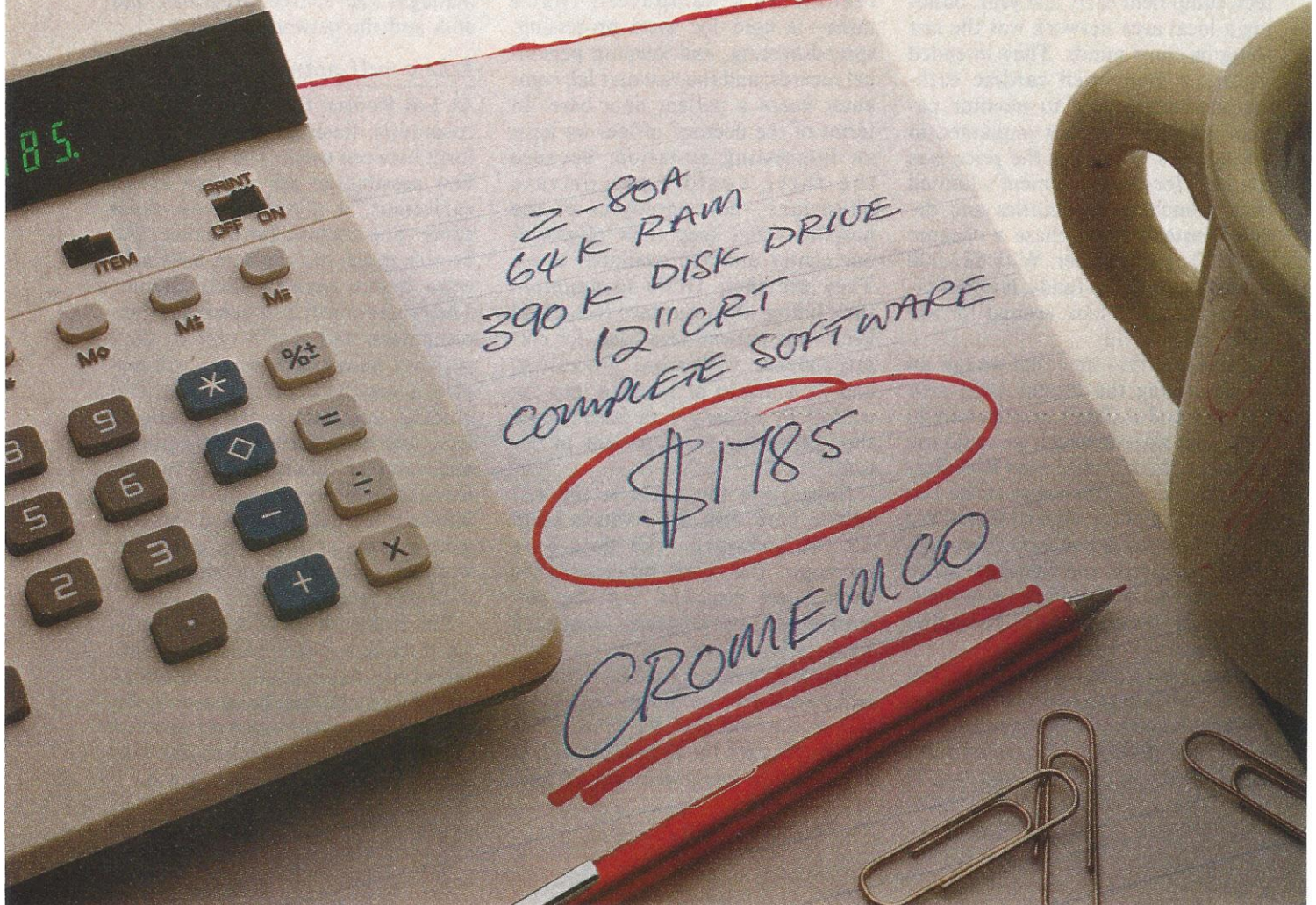
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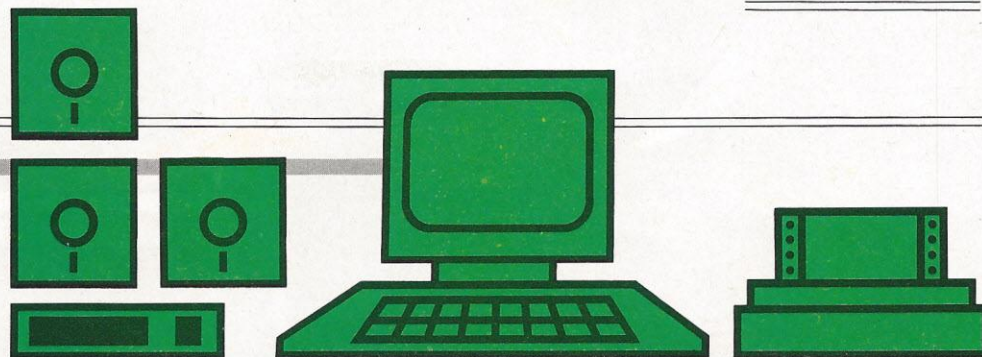
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CIRCLE 109





Los Robles's LAN is also a good illustration of the technological evolution that has taken place in the networking field over the past few years—evolution that has made local area networking on the personal computer more palatable to many.

One such development is the switch from twisted-pair cables to coaxial baseband wiring. Baseband wires have tumbled in cost recently to one-third the price of twisted pair; they transmit information far more quickly; and they offer an easy step up to eventually retrofitting the network with broadband coaxial wiring, a type of cable which can carry a host of data, voice, and broadcast messages simultaneously and is expected to be the wiring of choice in the future.

The other major improvement is the way in which the network's topology is configured. Earlier networks used what was known as a star configuration, where the master controller, usually a hard disk drive, was located in the middle of its "slave" equipment, and the network dispensed data from the center of the star to its arms. This made for slow communications because all instructions or commands had to be cleared and approved by the hard disk drive before they could go any further. The current configuration is bus topology, an arrangement where all the hardware on the network issues instructions independently and the master controller simply directs

the data traffic up and down the length of the wiring.

These types of changes, combined with a good reliability record and true economies of scale, are helping LANs gain popularity in corporate environments.

"The beauty of networking personal computers as compared with using minicomputers or mainframes is that with the mini or mainframe, each time you add a user to the system—each time you install a new dumb terminal—you detract from the overall computing power of the system. You simply slow the system down," says Jim Pritchett, president of Trinity Computing Systems in Houston, Texas, which sells LANs to large installations. "With the personal computer, though, it is just the converse. You add power to your system each time you enhance the network. You are giving it more memory or providing another peripheral or adding more storage capacity."

Experimental uses

The first local area network, ARCnet, was developed in the late 1970s just after personal computers arrived on the market. Yet, though they are still relatively new arrivals, some innovative and experimental LANs are already in operation.

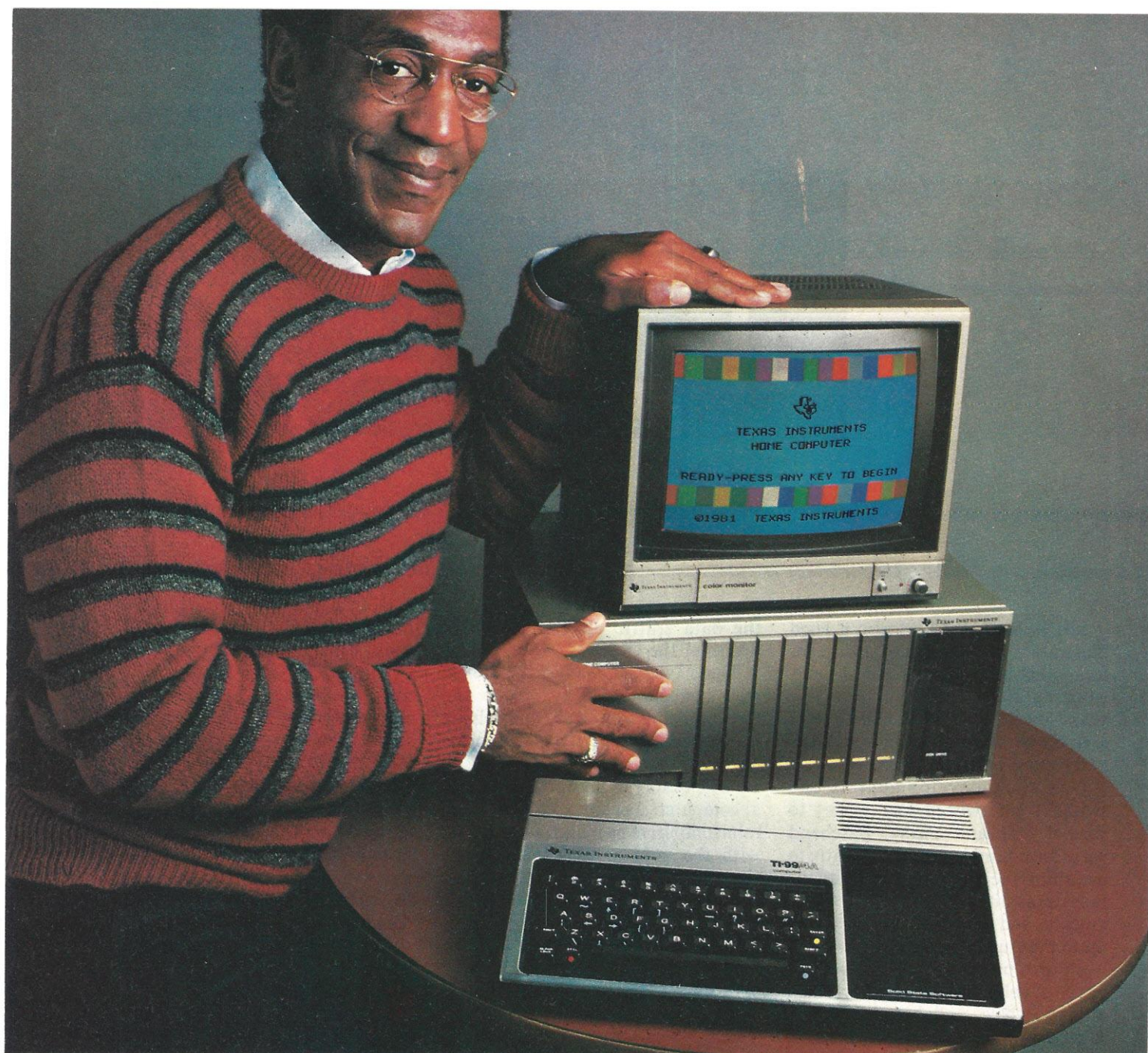
One of the more interesting is a sort of high-tech version of M*A*S*H. The United States Army Fifth Corps, stationed in West Germany, has automated the commu-

nications end of its command and control functions through a series of Omninet local area networks. Each division of the Fifth Corps is equipped with a fully on-line network. Data bases are kept on a Corvus hard disk at each site, and commanders key updates into the system through Apple computer workstations on their desks. A device known as a gateway is used to connect the mobile division Omninet to the network in place at the central command post.

The Fifth Corps's Omninet is hooked up via the twisted pair wiring, so it's not quite as fast as the PLAN 4000. An interface card with proprietary chips that handle the network traffic is put into slot 6, the major disk drive slot of the Apple computers on-line, and a network server is attached to the Corvus hard disk to dispense the software. Omninet may be a slower network than Nestar, but its network server is about 15 percent cheaper.

The software residing in the hard disk, which is at the disposal of all Apples on the network, includes VisiCalc and a group of custom programs such as a graphics package, a database manager with communications capability specifically designed for Army needs with password protection depending on rank, and a word processor.

"The Omninet at the mobile sites allow division commanders to make daily briefings to the Corps com-



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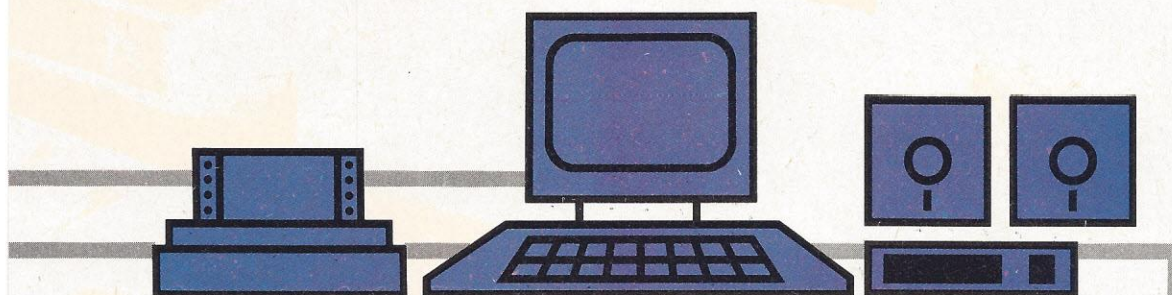
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CIRCLE 5

"If a LAN is constructed correctly it can open up new lines of communications."

PROFESSIONAL/
MANAGERIAL



mander at headquarters without any verbal contact," says Kevin Apsley, a systems analyst for BDM Corp. in McLean, Va., the designers of the network. "Each division commander has access to an updated data base listing state of readiness, status of personnel, availability of ammunition and food, etc. Every day after going on-line the division commander can put any portion of this data base into graphics form. The Corps commander can call up each daily report from the division commanders and watch it as though he were viewing a slide show of his troops."

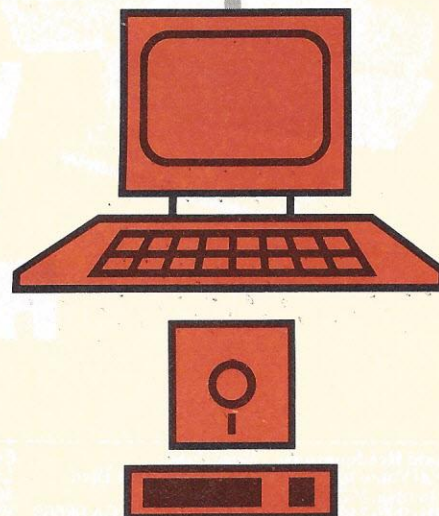
The Army is especially fond of the possibilities offered by the network's graphics software. On the Fifth Corp's Omninet there is a videodisk carrying a variety of geographic sites. This package gives commanders the capability to indicate enemy positions and then instruct the computer to superimpose them at the exact geographic location on the map taken from the videodisk. This updated map is saved on the Omninet hard disk data base and is available for inspection by any other commanders who have password clearance into that sector of the data base either on-site or at a distant network reached by a gateway.

Local area networks can offer a way around the communications and data redundancy logjam which can occur when too many separate computers are installed at a company. But it should be cautioned that they

are not a panacea. Certain deficiencies persist. Most local area networks can cover only a limited distance, usually less than a mile, to make up the entire computing circle. Not only that, different types of computers usually cannot communicate on the same local area network. For instance, Omninet supports the Apple II, IBM Personal Computer, Corvus Concept, and other computers, but there is no way for disparate computers to communicate with each other on Omninet once they are networked. Other LAN manufacturers claim to have achieved at least semi-universal computer communication, but a purchaser should investigate this before making a commitment.

These drawbacks aside, the local area network is one of the major trends in the future of personal computing. Careful consideration, though, should be given to choosing the network best suited to your particular operation and how it will help you do the tasks which you need accomplished by computerization.

"The ability to pass data between computers is only part of the local area network," says Charles Vamossy at Merrill Lynch. "The rest of the ability is in its architecture and its software base. If the network is constructed poorly, it will fail. But if it is constructed correctly, it can carry a corporation over a wide measure of its inefficient and paper-boggled past and open up previously closed lines of communications."





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Charting Your Way To Better Project Management

By organizing project data by computer, managers can make sure everything is done on time, on schedule, and within budget

by Elli Holman, Assistant Editor

As America tunes in to watch NASA's latest space-travel craft make its ascent into the atmosphere above Cape Canaveral, Florida, a little digital clock appears in the corner of the television screen. The announcer counts down the time until launch—"T minus 55 minutes, 10 seconds and counting." What we in front of the screen don't realize is that as each second is counted off, some person behind the scenes is completing his assigned task to get the craft off on time. If his job isn't finished at the precise predetermined time, the whole mission can come to a standstill.

Basically what is taking place during this preparation time is the result of many months of people performing sophisticated forms of project planning—critical path analysis and PERT charting. It is the responsibility of these people to chart the launch and all the tasks associated with it to make sure everything is done correctly and on time.

In the beginning

Projects such as the launching of a space craft involve so many different tasks and people that only the speed and memory capacity of a mainframe computer could be expected to handle their organization. But projects on a smaller scale, even the construction of a building, where resources are limited and the number of tasks in-

volved is smaller, can now be done on personal computers with the aid of PERT charting and critical path analysis software.

The concept of computerized critical path analysis stems from a technique developed in the late 1950s to aid in the planning of the Polaris mis-

sile system. The approach involves the division of a complex project into a series of shorter tasks which can be completed independently. The user can then analyze the timing involved in the tasks to determine which ones are "critical" to the overall completion of the project. A setback in

| JOB DESCRIPTION REPORT | |
|---|-------------------------|
| First Street Water Main | |
| Revision 10, 6/26/81 | |
| Prepared by Mike Posehn | |
| Job #1, Purchase the pipe | |
| Duration=2 Weeks | Earliest start=1/5/81 |
| Completed=No | Earliest finish=1/19/81 |
| On critical path=No | Latest start=1/12/81 |
| Slack time=1 Week | Latest finish=1/26/81 |
| Prerequisites=none | |
| Manpower skills=none | |
| Total effort=none | |
| Manpower cost=\$0 | |
| Direct cost=\$50000 | |
| Job #2, Dig 1st part of trench | |
| Duration=2 Weeks | Earliest start=1/5/81 |
| Completed=No | Earliest finish=1/19/81 |
| On critical path=No | Latest start=1/12/81 |
| Slack time=1 Week | Latest finish=1/26/81 |
| Prerequisites=none | |
| Manpower skills=Skill #1, Operating Engineer, 1 @ 1000\$ per Man-Week | |
| Skill #2, Laborer, 3 @ 500\$ per Man-Week | |
| Total effort=8 Man-Weeks | |
| Manpower cost=\$5000 | |
| Direct cost=\$0 | |

A typical PERT chart begins with a description of all of the jobs involved in the project, along with labor, cost, and time requirements for each one.

Charts courtesy of Digital Marketing Corporation, Organic Software Inc.®

any one job or task considered to be critical could cause the delay of the entire project.

There are two basic methods of critical path analysis—PERT charting and CPM. PERT stands for Performance Evaluation and Review Technique. This method treats a project as a series of events occurring within a time sequence and is used as a tool for reporting the progress of a large project. In many projects where PERT is used, the completion times of some jobs may be uncertain.

CPM, or Critical Path Method (not CP/M, the operating system) also treats a project as a series of activities. But this method is more useful for planning a project than tracking its progress.

Constructing the path

The critical path method is most often used in the construction industry where time requirements can be accurately estimated. People involved in planning a construction project would normally chart out the steps by hand, which takes a great deal of time. A project can include an enormous number of separate

tasks—some of which have to be done simultaneously and others which have to wait for another job to be done first.

Julius Grigore, a shipyard consultant who had previously done PERT charting and critical path analysis for project planning by hand, got his first taste of computerization last year when he was hired to supervise the building of two tugboats in Brownsville, Texas by Valleyship Building, a subsidiary of Faustug Inc. of San Francisco. Grigore planned the tugboat construction using a Victor 9000 computer and Milestone, a \$295 PERT charting and critical path analysis package published by Digital Marketing of Walnut Creek, Calif.

With no background in computerized project planning, Grigore was reluctant to put the tug plan straight into a computer. Instead he designed the project the way he normally would, then took the task sequences from his hand-drawn PERT chart and plugged them into the Victor 9000.

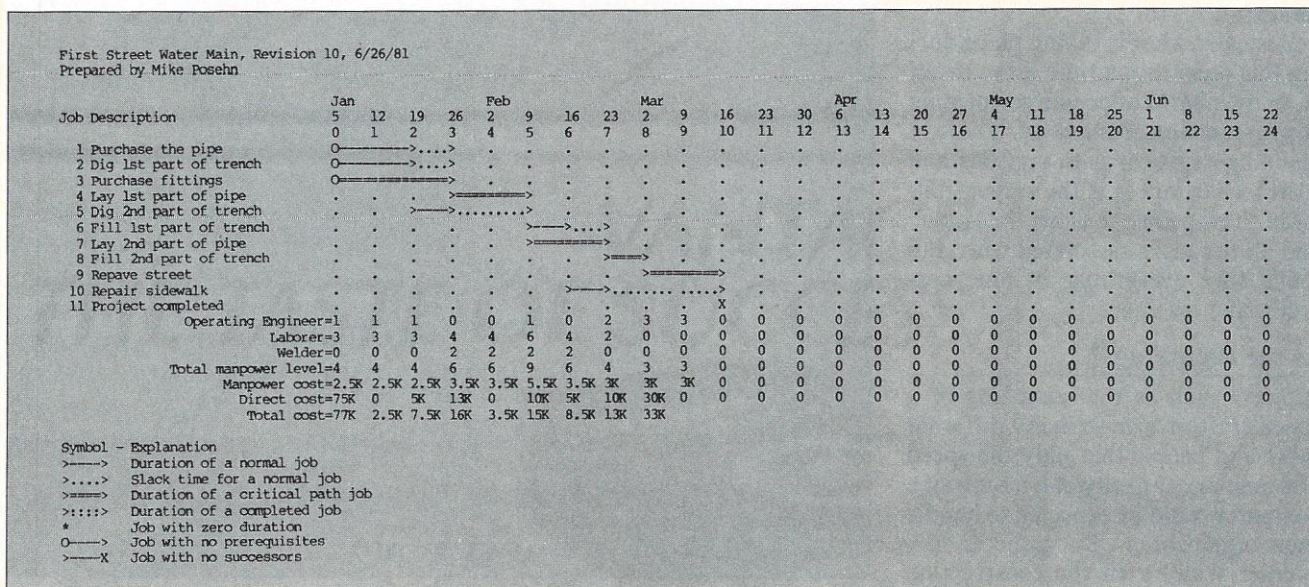
The plan for building the tug started with the arrival of the steel and

other materials at Brownsville. From here the sequence of operations continued through laying in the steel and fixtures, to the time the tug was sea trialed, dock trialed, launched, and then certified and accepted by the new owner. Fitting these steps into a program required about 118 inputs into Milestone.

"I came to the conclusion that we could build the two tugs in five months," says Grigore. "The management had originally planned on building them in six or seven months."

Grigore's hand-drawn PERT chart did not vary significantly from the one Milestone produced. "What I did by hand took a lot longer," he says, "and if I wanted to vary the program it would take me a week or two, compared with the computer's ability to change all 118 items in an instant."

But it takes more than an instant to set up the chart. Grigore worked with a typist to input the 118 variables that made up his computerized chart. "Without her support the thing could have dragged on for two or three weeks," he says. "It's not a one-man job."



The master schedule of a PERT chart co-ordinates the elements of the project within a timeframe with start and finish dates.

"We needed to keep 136 people balanced or we were going through the Rocky Mountains on each job."

When Grigore first started planning the projects, it was decided construction time would be calculated in man-weeks, so he produced a chart accounting for time in this way. Then management decided it would rather see a plan in man-days. "They thought it would be a horrendous task to change everything, but I punched a couple of keys and in about two seconds the entire configuration of the project changed from man-weeks to man-days," he says. "They were amazed—and so was I—that you could vary your chart so drastically, almost instantly."

Showing off

Milestone, the package Grigore and his shipyard colleagues were using, produces four reports for easier project management: an overall project summary, a job description breakdown, a columnar report, and a time graph.

The overall project summary provides a kind of "everything you ever wanted to know about Project X" description. It lists pertinent information about the project (job title and leader, for example) and then breaks down the project into skill categories, working hours, and a schedule summary with completion date, number of jobs, total manpower, and direct costs.

The second report breaks down each job within the project giving its duration, whether or not it's completed, whether or not it's on the critical path or if it will delay the overall completion of the project if it's not done, how much slack time is involved in the job, the required manpower skills, cost information, and the earliest and latest start and finish dates.

The third report is in a columnar format which allows the user to tailor information to his needs. Finally, the fourth report is a time graph in which a list of the jobs involved in the project is presented on the screen in a horizontal format spread over a

| TIME SCALE | TIME SCHEDULE EXAMPLE | | | | | | | | | | |
|-----------------|--|--|--|--|--|--|--|--|--|--|--|
| HOURS | <div> <div>Thu Jan 1</div> <div>8 9 10 11 12 1 2 3 4 5 6 7 8 9 10</div> <div>0 1 2 3 4 5 6 7 8 9 10</div> </div> | | | | | | | | | | |
| DAYS | <div> <div>Jan</div> <div>1 2 3 4 5 6 7 8 9 10 11</div> <div>0 1 2 3 4 5 6 7 8 9 10</div> </div> | | | | | | | | | | |
| WEEKS | <div> <div>Jan 6 13 20 27</div> <div>0 1 2 3</div> <div>Feb 3 10 17 24</div> <div>4 5 6 7</div> <div>Mar 2 9 16</div> <div>8 9 10</div> </div> | | | | | | | | | | |
| MONTHS | <div> <div>1980</div> <div>Jan 0 1 2 3 4 5 6 7 8 9 10</div> <div>Feb 1 2 3 4 5 6 7 8 9 10</div> <div>Mar 1 2 3 4 5 6 7 8 9 10</div> <div>Apr 1 2 3 4 5 6 7 8 9 10</div> <div>May 1 2 3 4 5 6 7 8 9 10</div> <div>Jun 1 2 3 4 5 6 7 8 9 10</div> <div>Jul 1 2 3 4 5 6 7 8 9 10</div> <div>Aug 1 2 3 4 5 6 7 8 9 10</div> <div>Sep 1 2 3 4 5 6 7 8 9 10</div> <div>Oct 1 2 3 4 5 6 7 8 9 10</div> <div>Nov 1 2 3 4 5 6 7 8 9 10</div> </div> | | | | | | | | | | |
| QUARTERS | <div> <div>1980</div> <div>Jan 0 1 2 3 4 5 6 7 8 9 10</div> <div>Apr 1 2 3 4 5 6 7 8 9 10</div> <div>Jul 1 2 3 4 5 6 7 8 9 10</div> <div>1981</div> <div>Jan 1 2 3 4 5 6 7 8 9 10</div> <div>Apr 1 2 3 4 5 6 7 8 9 10</div> <div>Jul 1 2 3 4 5 6 7 8 9 10</div> <div>1982</div> <div>Jan 1 2 3 4 5 6 7 8 9 10</div> <div>Apr 1 2 3 4 5 6 7 8 9 10</div> <div>Jul 1 2 3 4 5 6 7 8 9 10</div> </div> | | | | | | | | | | |
| FISCAL QUARTERS | <div> <div>FY80</div> <div>Oct 0 1 2 3 4 5 6 7 8 9 10</div> <div>Jan 1 2 3 4 5 6 7 8 9 10</div> <div>Apr 1 2 3 4 5 6 7 8 9 10</div> <div>FY81</div> <div>Oct 1 2 3 4 5 6 7 8 9 10</div> <div>Jan 1 2 3 4 5 6 7 8 9 10</div> <div>Apr 1 2 3 4 5 6 7 8 9 10</div> <div>FY82</div> <div>Oct 1 2 3 4 5 6 7 8 9 10</div> <div>Jan 1 2 3 4 5 6 7 8 9 10</div> <div>Apr 1 2 3 4 5 6 7 8 9 10</div> </div> | | | | | | | | | | |

A time schedule divides the project into several types of time periods making it easier for managers to determine labor requirements and to allocate workers efficiently.

calendar. These two reports are particularly useful for presentations to management.

If it only did . . .

Once you have the chart in front of you, you may suddenly learn there are going to be problems with your project down the road. Grigore and his colleagues soon realized there was nothing the computer could do to help with some of these problems.

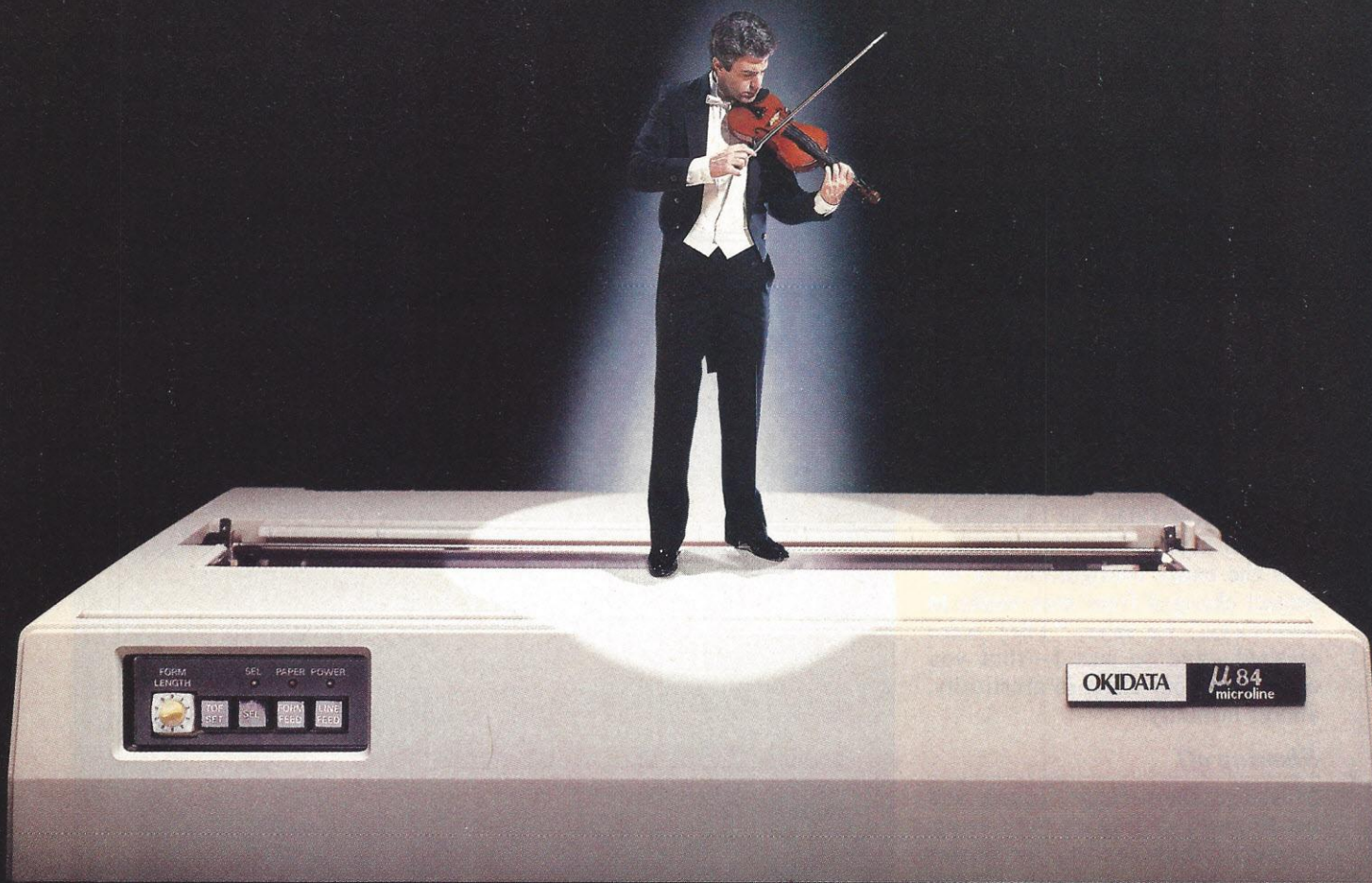
For example, one of the most critical factors in putting a project together is managing the labor force involved. After Grigore assembled his project plan, he and his colleagues realized that if Milestone had allowed them to balance the labor force or have a constant number of people working at all times, it would have been an even more valuable management tool than it already was. As he puts it, "Our labor force was hitting too many peaks and valleys.

"We were finding out that, for in-

stance, on one day we needed only eight people, and then three days later we needed 43 people, and then we dropped again to where we only needed six," he says. "You can't hire people that way." The shipyard where Grigore was working employed 136 people on a single shift. In an ideal situation, he would have liked to program for a straight line work force where 136 people, plus or minus 3 percent to account for absenteeism, were working at all times.

"Although it's valuable to know which craftsmen are assigned to which job and how many people are required to do a certain task, we still needed to keep 136 people balanced or we were going through the Rocky Mountains on each job."

Grigore feels that if the program had been able to plot labor force and cost curves it would have saved even more time. Another feature he would like to see incorporated into the package would be some way of manag-



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"I learned a lot from this job. I should have been paying them to teach me."

ing the reams of paper generated.

But overall, Grigore was thrilled to be working with the computer and Milestone. "I learned a lot from this job," he says. "I should have been paying them to teach me."

Planning for the future

Grigore went into the tugboat job without a background in computerized critical path analysis, but some people approach this subject from the other end—mainframe critical path analysis. Philip Mongelluzzo, for example, had extensive experience using critical path analysis software on a time-sharing system before he started using Westico's \$395 MicroGantt in Norwalk, Conn. on his NorthStar Advantage.

Mongelluzzo is a staff manager for electronic information systems at Southern New England Telephone, based in Connecticut. His job is to plan and schedule the technical aspects of future projects for his company.

Southern New England Telephone, or SNET, is a billion-dollar company which, historically, has been an independent part of the Bell System. As a result of a consent decree between AT&T and the U.S. Department of Justice that went into effect last August, SNET was put into a position where it could begin to expand into new unregulated areas of business beyond providing telephone service. To meet this challenge, the company set up business planning teams to look at potential markets for new and enhanced services.

Mongelluzzo's team is made up of highly skilled technicians—computer-oriented people who are now operating in this new and constantly changing environment.

"We are beginning to enter the competitive marketplace and, as a result of the demands placed on us, we have to change our managerial style," he says. "You can't be a traditional manager where you can sit down and say, 'OK, we're going to plan this

PROJECT DESCRIPTION REPORT

First Street Water Main
Revision 10, 6/26/81
Prepared by Mike Posehn

DESCRIPTION DATA FIELDS:
Name of project=First Street Water Main
Leader of project=J. K. Henderson
Time scale=Weeks
Start date=1/5/81
Direct cost units=K\$
Manpower cost units=\$
Find critical path=Yes
File drive and name=A:example1

SKILL CATEGORIES:

| | Description | \$/Man-Week | Man-Weeks | Total Cost |
|---------------------|--------------------|-------------|-----------|------------|
| 1st skill category= | Operating Engineer | 1000 | 12 | \$12K |
| 2nd skill category= | Laborer | 500 | 29 | \$14K |
| 3rd skill category= | Welder | 750 | 8 | \$6K |
| 4th skill category= | Civil Engineer | 1500 | 0 | \$0 |
| 5th skill category= | | 0 | 0 | \$0 |
| 6th skill category= | | 0 | 0 | \$0 |
| 7th skill category= | | 0 | 0 | \$0 |
| 8th skill category= | | 0 | 0 | \$0 |
| 9th skill category= | | 0 | 0 | \$0 |

WORKING HOURS:
Begin work=8
Start lunch=12
Finish lunch=12
End work=17

WORKING DAYS:
Days of the week=MTuWThF

HOLIDAYS:
Holiday list=1/1/81 5/25/81 7/4/81 9/7/81 11/26/81 12/25/81

SCHEDULE SUMMARY:
Completion date=3/16/81
Number of jobs=11
Total manpower=49 Man-Weeks
Manpower cost=\$32500
Direct cost=\$148000
Total cost=\$180500

The project description report incorporates all the jobs, skills, work-hours, and costs into one summary, providing an overview for project managers.

project and we are going to start here and finish here, and if we run into a problem we're going to reschedule this and we're going to try to make it up here.' Things are changing so rapidly, we have to not only be able to change our schedule around but we have to adapt rapidly as well."

Eliminating counterproductivity

SNET provides an in-house time-sharing system for its managers to help them with project planning and adaptation. But the company also has a microcomputer center whose sole function it is to help individual de-

partments and managers determine which hardware and software combinations will help them get their jobs done more quickly and productively.

"We recognized the fact that microcomputers were here to stay and the key to success was to manage the computer and to pass along the local processing power to managers at various levels," Mongelluzzo says.

"MicroGantt allows me to look at what we're doing and adapt rapidly," he says. "I can prepare my schedule and look at a task from a top-down or a bottom-up view. I can look at it and
(continued on page 210)

Farming Smarter With A Computer

A seasoned pro handles three farms, several hundred acres, and an "impossibly" tough bookkeeping job with an Apple, VisiCalc, and BPI

by Charles Rubin
research by Dick Landis

While his neighbors spend their time worrying about agricultural techniques, Jesse Griffith of Blackfoot, Idaho is using a personal computer as a management tool to farm a little smarter. Griffith has developed a sophisticated farm management system that balances his books, tracks costs, and provides easy access to detailed budget figures covering all aspects of his grain farming operation.

"I've never had any formal agricultural training," Griffith says, "but I spend a lot more time on bookkeeping than my neighbors do." He believes that knowing where the money is coming from and where it's going each month is as important as having the tallest barley in the county. But he didn't come to that conclusion while sitting behind the wheel of a combine.

Although raised on a farm, Griffith studied mechanical engineering with a minor in accounting, and spent over 20 years as an engineer for Westinghouse, General Electric, and Lockheed. He returned to farming in 1962.

"It wasn't the best move financially," he says, "but I'd been trying to run the farm with a hired manager,

and it just wasn't working out." When he went back to the farm, Griffith used his accounting knowledge to set up a detailed bookkeeping system that would give him an accurate picture of his monthly expenses. He also needed to be able to compare actual figures with his budget projections. That meant knowing exactly how much money went for each type of expense, which isn't as easy for a farmer as it might be for someone with a full-time bookkeeper.

Typically, a farmer projects the year's expenses for seed, water, fertilizer, fuel, labor, equipment, and support for himself and his family. That projection is taken to a bank, where a line of credit is established for the total amount. As the season progresses, the farmer borrows money as he needs it.

Most farmers use a single-entry accounting system which works fine—until the farmer forgets to make an entry. Since plowing, planting, fertilizing, and other farm work occupy 98 percent of a farmer's time, he's lucky if he can scrape together two hours a month to do the books. Often, minor expenses are forgotten when it comes time to make journal entries, and that means losing track of where the money went.

To overcome this problem, Griffith set up a bookkeeping system which requires that every entry must be made twice: once as a debit for the

cost of the item, and once as a credit from the bank account. "The double-entry system forces you to correct your mistakes and figure out where the money went," he says. "You've got to balance the books every month, and if they don't balance, you know you forgot an entry somewhere." To correct omissions, Griffith could simply compare the credit side of his journal with his monthly bank statement, locate the credit that didn't have a corresponding debit, and enter the missing debit amount.

New problems

Griffith's new accounting system was efficient, but it was also time-consuming. And Griffith found himself with even less time when in 1974, his two sons bought farms and the three businesses were united in a corporation. If balancing the books for one farm was tough, it was virtually impossible for three. Now Griffith had to deal with three crops, three sets of books, and overall accounts for the corporation.

The problems didn't stop there. Where there had only been one person doing the spending, there were now three, making it all the more difficult to keep track of expenses.

When Griffith began to analyze his situation, he decided his needs might best be served by a personal computer and accounting software. He thought that if he devised a sys-

Charles Rubin is a free-lance writer from California. Dick Landis is a management consultant with Agri-management in Yakima, Washington.

When Griffith analyzed his situation, he decided his needs might best be served by a computer and accounting software.

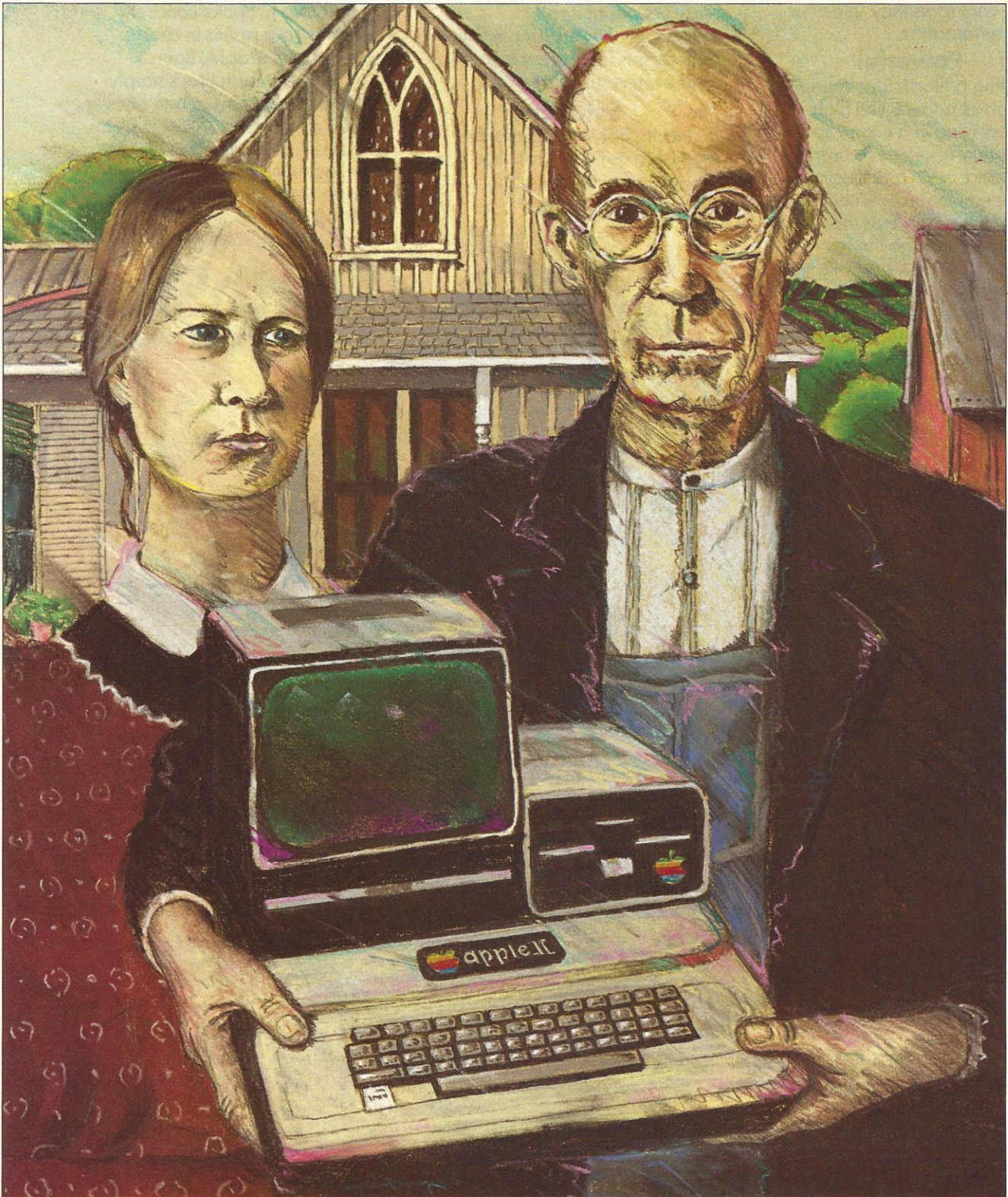


Illustration by Steve Osborne

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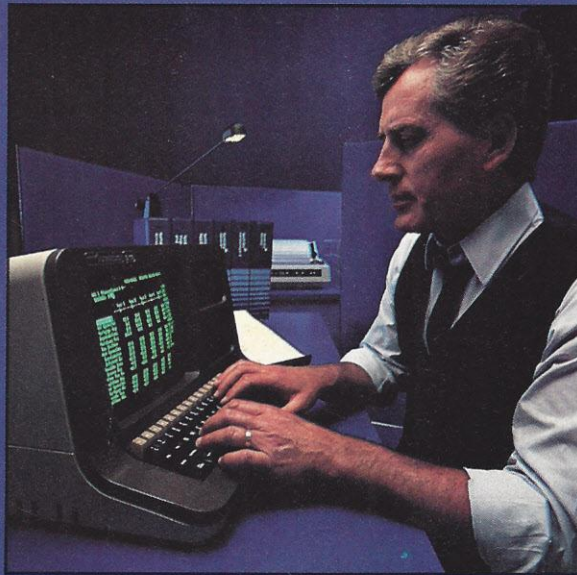
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*We were lumping costs together
because there wasn't enough time
to separate them properly.*

PROFESSIONAL/ MANAGERIAL

tem that would keep track of the corporation's expenses and income, balance the books, make budget projections and analyze costs, he would save time and increase the efficiency of his operation.

Shopping for a computer was a fairly quick process for Griffith. Most sales and service facilities for personal computers were at least 200 miles away. The only local sales and service outlet carried the Apple line, so Griffith bought an Apple II system. For software, he chose VisiCalc and a general ledger package from BPI Systems of Austin, Texas.

"The BPI package was designed for businesses with up to 10 locations," Griffith explains. "You code the departments and expense categories with four-digit numbers. The fourth digit indicates the department the expense belongs to, and the other three digits identify the expense category."

By the time he decided to computerize his accounting, Griffith's sons had taken over most of the farming supervision work, leaving him the freedom to get his system up and running the way he wanted it. "My intention was to do cost accounting," he says, "so I wanted to break down our expenses into smaller, more descriptive categories."

In his manual accounting system, Griffith had divided his expenses into about two dozen categories. "We were lumping a lot of costs together," Griffith says, "because there wasn't enough time to separate them properly. Labor was just entered as labor. We didn't distinguish between skilled or unskilled labor. They have a different value, of course, so we weren't able to tell how much of the more expensive labor time was involved in a given operation."

The three-digit expense category combinations allowed for up to 1000 different types of cost for each corporate entity. Griffith subdivided the two dozen categories into nearly 300, giving himself more flexibility for

TRENDS IN COMPUTERIZED FARM MANAGEMENT

Jesse Griffith's experience, as described in the accompanying article, is not necessarily typical, according to Dick Landis, who provided the original research for the story. Landis brings a broad perspective to the matter. He writes a column on computers and farming, called "Computers Afield," which runs in six regional newspapers from upstate New York to his own area of Oregon and Idaho. In addition, he has a Yakima-based consulting service which provides support and training for farmers who are looking to computerize.

"Software for the farmer is definitely getting better," Landis says. "At first, everyone was trying to adapt standard business packages to farm accounting procedures. That can be done successfully, as Jesse Griffith's story shows. And another farmer I know has done something similar with the Peachtree package, running on the IBM Personal Computer. But that takes a guy who really knows what he's doing. The better bet for the farmer is to pick something that works, rather than try to customize."

Most farmers, Landis says, don't go in for double-entry bookkeeping; they tend to rely on checks and deposits as their sole means of data collection. "Secretary of Agriculture, an FBF package, is a good example of a program based on this check-writing function," Landis says.

This isn't always the case. "Understand of course that when you get into a large farm, a big corporate enterprise, the accountants do a lot of the work and the farm becomes more like a standard business and so the big double-entry bookkeeping systems fit. But for most farmers, single-entry is the standard. What the new programs have done, and this is the most exciting part of it, is to enable the farmer to keep track of his crops, or his machinery expenses. That's the main contribution of the new software."

Landis expects further improvements in farm software. "Three or four years ago, you didn't have any-

thing. But farm bureau people, the big seed and feed companies—individuals all over the country—have picked up on computers. You're going to see a lot more farm money invested in computers, and in turn, more programmers are going to write for the farmers."

How about hardware on the farm? What kind of systems predominate?

"Well, you'll find some CP/M-based machines, but more often it will be Radio Shack or Apple. In our area for example, we're fairly isolated and have a low population density, and that means that you don't have a lot of dealers to choose from. It still doesn't break out much from Radio Shack and Apple, although IBM is coming along. You don't see DEC or Vector Graphic or Altos or Northstar—although those machines are more common in the Midwest, where farmers might be a little closer to population centers."

Beyond hardware or software, the element which will really make farm computers as common as tractors is the increased availability of training and support. Control Data, for example, is expanding into the farm area, and one of their first moves will be to open regional training centers. A number of the software houses, as well, are looking for local people to provide training and support. Landis's own company emphasizes training—his wife Jan was not only a teacher but once managed a Radio Shack Computer Center as well. And they offer support. "You've got to be willing to go out in the middle of the night to do a software patch, if somebody's printer isn't working right," Landis says. "Support is crucial. Sometimes you get a hacker, or a hobbyist, who has the time to figure it all out. But more often, the farmer is getting the computer so he can do his payroll in a crisis situation, say, when his asparagus is getting cut, or handle all his dairy farm records. And he doesn't have a minute to play with it when he's in the middle of production."

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“There’s no question that having the computer makes me a better manager.”

**PROFESSIONAL/
MANAGERIAL**

cost analyses. The labor category was split into management, skilled, and unskilled labor. Expenses for water, power, fertilizer, and other items were classified according to the crop they were used on and then coded to the farm they were used on. “We grow wheat, barley, and alfalfa on the three farms,” Griffith says, “and we rotate the crops every year. I wanted the system set up so I could tell how much it was costing to raise each crop, whether it was cheaper to raise a certain crop on a certain farm, for example.”

The corporation’s farms cover several hundred acres on roughly a dozen fields. Griffith divided the fields into six groups for cost accounting purposes. Equipment costs for the corporation’s three combines and five tractors are assigned to the fields they are operated in, based on the amount of time spent in each field.

The managerial edge

“There’s no question that having the computer makes me a better manager,” Griffith says. “I probably spend as much time on accounting work now as I did before I got the system, but I’m doing a lot more in that time now.” Besides giving him the peace of mind that comes from knowing exactly where he stands in relation to his budget projections each month, the computer offers easy access to facts that help Griffith make planting or buying decisions. His detailed expense records will show how much per acre it costs to bring in a certain crop each year. “If the per-acre cost for the same crop changes a lot,” he says, “I can find out which part of the operation made the difference, and I can do something about it. If a tractor is costing me more than it’s worth to repair and I’d be better off buying a new one, it’ll show up through the higher repair costs when I do the cost analysis.”

The computer helps balance the books, too. While the old system only showed errors when Griffith bal-

anced the books at the end of the month, the BPI system identifies errors as they’re made. “The computer won’t let you go out of balance,” Griffith says. “If you make a debit entry and don’t match it with a credit, you get an error message. You have to correct the mistake or enter an override command if you want to continue.”

The BPI system produces separate monthly income statements for the four corporate entities within minutes each month. Griffith gets a printout which he checks against the bank statement.

Griffith Farm’s entire accounting system is kept on three disks. One holds the expense statements for the four corporate entities, the second stores specific entries for each of the cost categories (totals for each category are then transferred to the first disk for the monthly statements), and the third disk stores equipment records and depreciation information.

Each of the corporation’s equipment accounts has been coded with a depreciation-related set of information that will show the description, code number, purchase price, date of purchase, and dollar amount or percentage of annual depreciation in one line. To print out a depreciation schedule, Griffith enters the equipment’s four-digit number to call up the file and enters the previous end-of-year value for the equipment, and the depreciated value for the new year is automatically calculated.

Budgeting with a spreadsheet

Griffith uses VisiCalc to update his budget projections for the four corporate entities. The two dozen budget categories have been increased to nearly 60. “When I was doing projections by hand,” Griffith says, “I was lucky to get them done twice a year. Now I do them every two months.” He points out that addition, subtraction, and changes in one category’s projection that used to require

long and inaccurate hand calculation are now done automatically with VisiCalc.


After he does his yearly budget projection at the beginning of the season, Griffith projects throughout the year in two-month segments. “I do it this way,” he says, “because I discovered I can fit two months on each spreadsheet.”

The projected figures are matched against actual costs when they become available, and the actuals are then used to prepare the next period’s projection. “I’ve always been pretty accurate with my projections,” Griffith says, “but I’m a lot faster with them now.”

Making things better

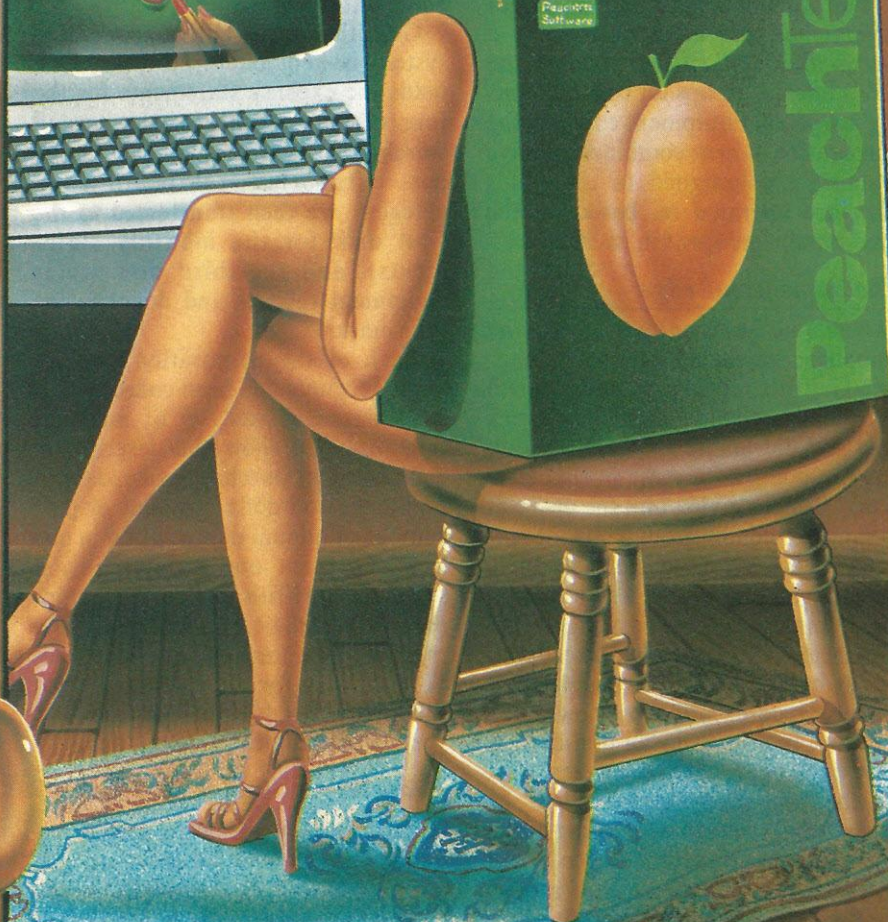
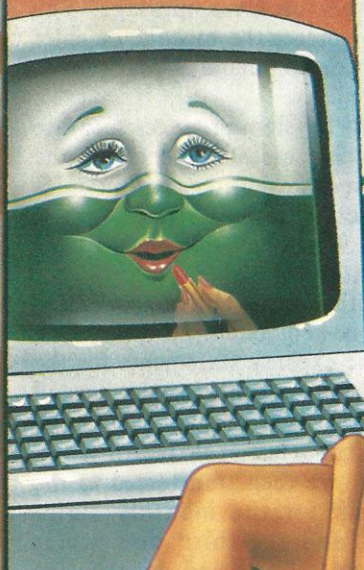
Griffith says he’s pleased with the computer system, but he’s constantly making improvements. “If you’d asked me how long it took to get things working after I’d had the system eight months, I’d have said, ‘Eight months.’ Now, after 14 months, I’ll say, ‘14 months.’ I’m always trying to make things better.”

When asked his advice on setting up a similar system, Griffith focused on documentation. “You don’t need to know programming to set up a general ledger system,” he says, “as long as you know your accounting and how you want it to work. The problem with these programs is they’re so powerful, and the documentation is so detailed, that it takes a while to get to the part of the manual that applies to your situation.” Between the three software packages Griffith bought, there were over 1000 pages of documentation. He went through each manual, making notes from pertinent sections as he went along, and ended up with about 30 pages of notes that tell him what he needs to know for his applications.

Griffith feels that thanks to his personal computer, he has the best-managed farm in the area. When it comes to really making it in farming, that may be what counts. 



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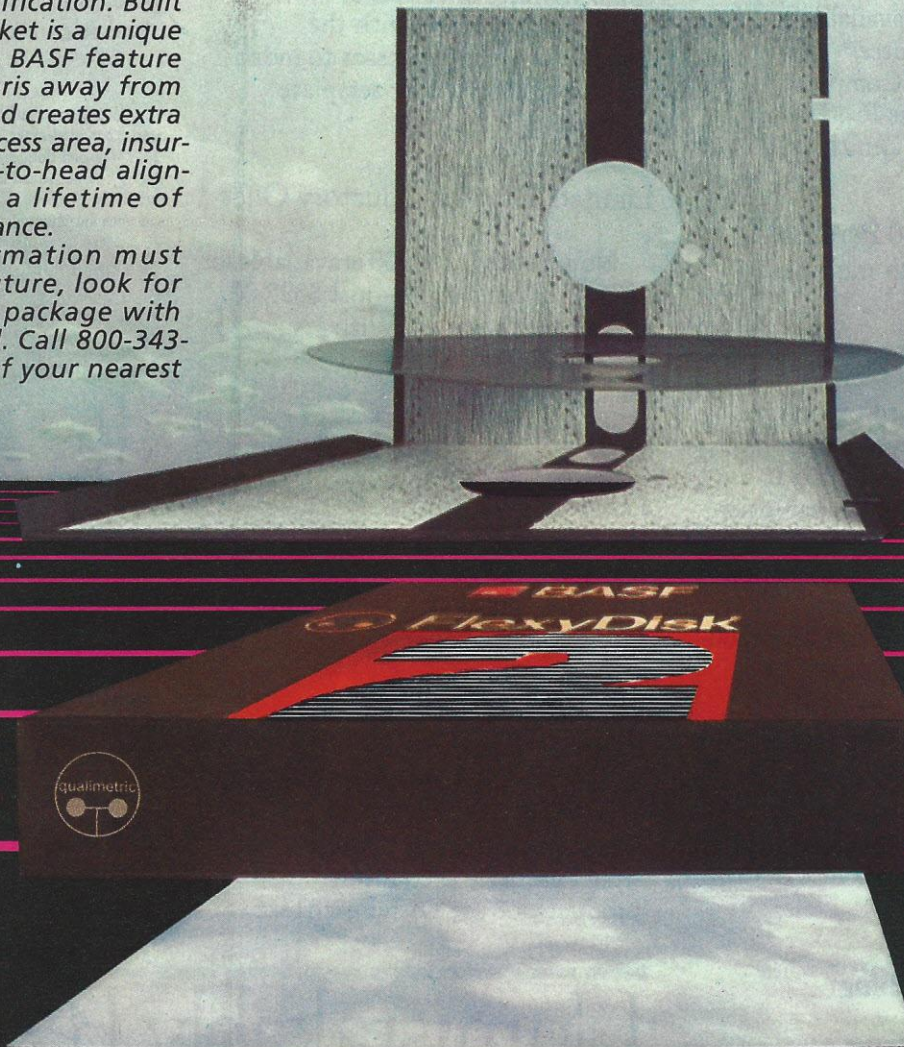
CIRCLE 53

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CIRCLE 114

Control Typesetting With Your Personal Computer

With standard word-processing software and a modem, you can use a personal computer to set type for printed documents

by John King, Assistant Editor

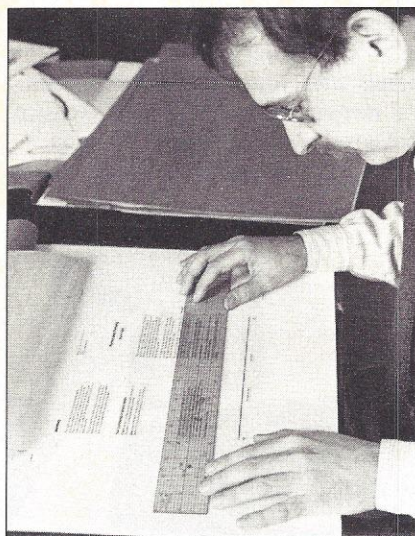
A professionally printed report, proposal, or sales message can make a strong impression. For a professional or manager, printed documents can make the difference when promotions are decided on. For a small businessman with a product or service to sell, printed messages are a professional-looking lure for potential customers.

Yet there are elements involved in professional typesetting that might make you hesitate. You have to take the manuscript to a typesetter and wait for it to be rekeyboarded into the typesetting machine. You have to make more trips to the typesetter to check galleys for new errors that may have been introduced at each step in the process. And, of course, you have to pay for these activities both in typesetting fees and in the time you devote to the task.

If you use a personal computer for word processing, you can also streamline the printing process. An increasing number of typesetters around the country are fitting their typesetting machines with modems to receive text directly from personal computers. And, by entering simple codes in the text of the documents you send, you can control the format.

People using their personal computers this way are saving time by bypassing the process of having the documents rekeyboarded at the typesetting house. They are cutting an av-

erage of 30 to 50 percent off the most expensive part of the printing process—setting the type itself. And they're enjoying these savings without sacrificing the high quality they've come to expect from professional typesetters.



Don Huesman of Conceptual Instruments checks alignment of copy during paste-up.

Typesetting from a personal computer seemed a logical next step to Don Huesman, senior writer for Conceptual Instruments, a Philadelphia-based software company. In late 1981, while typing chapters of documentation for an Apple II software manual, Huesman realized something. "All my typing and proof-

reading will have to be repeated at the typesetter's keyboard," he thought. Then he theorized: "Why can't I just take my floppy disk to a typesetter and eliminate that duplication of effort?" For Huesman, the search was on.

He began talking to typesetters and discovered the beginnings of a revolution in the phototypesetting business. In Philadelphia, Huesman found the typesetter John C. Meyer & Son had just installed new equipment, allowing the company to accept text from personal computers. The setup required modem transfer of Huesman's text to the typesetter.

By February 1982, Huesman had hooked a Novation modem to his Apple II Plus and was working out an arrangement with Meyer & Son to send text from his UCSD operating system text editor. In the fall of 1982, Huesman had used his Apple II to typeset a complete manual for one of Conceptual Instruments's software products.

Setting up the system required some advance planning. In cooperation with Allan J. Hayes, technical representative at Meyer & Son, Huesman worked out a series of customized codes to embed in the text of his documents. The codes indicated type style, type size, line length, italics, and the like. Huesman transmitted his coded text via his modem. Meyer & Son received the text using

Photos by Sal DiMarco/Black Star

a modem of a Shaffstall MediaCom 3300 interface. This interface is essentially a dedicated microcomputer that uses 8-inch floppy disks and it is attached to the typesetting machine. The Shaffstall interface was programmed to do an automatic global search through the text; whenever it finds a code, it translates it into a command understood by the typesetting machine. On the interface's video terminal display, a human operator could also preview Huesman's format for errors. When everything checked out, the operator hit a button; the type was set, and the film developed, ready for pasteup and printing.

Huesman soon found that another printer, Precision Graphics of Pennsauken, N.J., was geared to do the same as Meyer & Son. With Precision Graphics, Huesman discovered how fast the new system could be. His company can now call Precision Graphics at 4:00 p.m. and transmit a couple of chapters. By 9 a.m. the next morning, typeset camera-ready copy is on the desk ready for pasteup.

This new system is saving money

for Conceptual Instruments. Typesetting now costs half of what it did before the company began doing it with personal computers. They elected to spend this saving on better quality type and paper, and have improved the appearance of their printed product. Now they get a better product in less time, and at the same cost as manual typesetting.

Implementing the system wasn't all smooth sailing. "One time I sent two chapters, with a chapter break and new chapter heading set in 24-point type in between," Huesman recalls with a laugh. "But I forgot to indicate that the type should go back to normal text face after the second heading. As a result I got back a whole chapter set in the heading-size 24-point type—which was not only useless but expensive." The solution? Huesman now makes sure to print out his text on an in-house printer and proofread his codes in addition to text. "Checking your copy and commands with your own in-house printer," he points out, "lets you make sure that kind of thing doesn't happen."

For sending text via modem, Hues-

man uses a communications package developed by Conceptual Instruments. According to several typesetters, a standard communications package—one which comes with whatever system you're using—is adequate for this task.

Conceptual Instruments uses a Hayes SmartModem, and the company plans to send text at 1200 baud using an IBM Personal Computer with WordVision. As Huesman points out, sending at 1200 baud will make a big difference in the cost of transmitting the text for whole manuals. A major expense in sending text via modem is the amount of time spent on the telephone lines. Data transmitted at 1200 baud is four times faster than data transmitted at 300 baud, so telephone charges for a transmission will be cut by a factor of four.

With the Shaffstall MediaCom 3300 interface hooked up to its Mergenthaler Linotron 202 typesetting machine, John C. Meyer & Son can receive text via modem from virtually any type of personal computer. Customers can also mail in or hand deliv-



At typesetter John C. Meyer & Son, VDT operator Donna Durso checks copy for coding errors and assigns a job number to the file.

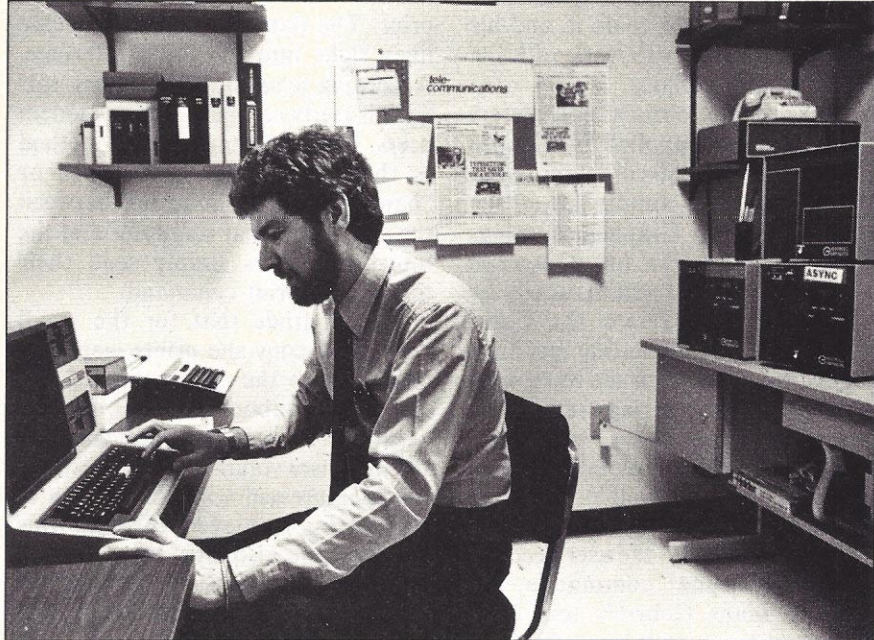
Most personal-computer users find the modem connection convenient and satisfactory.

er their own disks to the company, but that's not the way Meyer & Son prefers to receive text. According to technical representative Allan Hayes, reading a client's disks is more difficult than receiving text via modem; often, because of the variety of hardware and software that clients can use, there are complications with compatibility and format.

Most typesetters, in fact, prefer to receive text via modem—and find that telephone line interference is not a problem in garbling either text or codes. And most personal-computer users find the modem connection equally convenient and satisfactory. “We’ve never had a byte out of place due to phone-line interference” observes Huesman.

Typesetter Gary Heger, president of the ACP division of Hayden Publishing Co., has a different opinion of modem transfer. Heger feels that telecommunications is a poor way to go, especially for transmitting long blocks of text or when transmitting over long distances. “When you’re talking about typesetting a book, you want a disk and hard copy,” he says. He adds that the slowness of transmission at 300 baud is impractical and costly for long text transmission. He also feels that a disk is more reliable for character integrity and that with modems, material is lost or garbled due to phone-line interference. For small blocks of text which only travel short distances, such as inter-office connection, Heger thinks modem transmission is satisfactory. But for frequent use, particularly over long distances, he says the reported saving of 35 to 50 percent drops to about 10 percent when you consider phone costs and line interference.

Tony Shaffstall, sales manager of Shaffstall Corporation in Indianapolis, agrees with the claims of most typesetters who use modem transfer of text: Phone line interference is not a big problem. Shaffstall admits that sometimes, particularly on the East Coast where equipment is old, phone



Alan Hayes of John C. Meyer & Son transfers copy received on disk from a customer's TRS-80 Model III to one of the three Shaffstall interface units behind him.

transmissions can be variable, particularly in poor weather. He points out that the asynchronous protocol used by most personal-computer communications packages has a higher potential of interference errors than synchronous or bisynchronous protocols. This is because the latter two protocols have more sophisticated methods of checking for transmission error. “Even so,” he observes, “errors introduced through telephone transmissions are generally far less than those introduced through manual typesetting and proofreading.”

Ease of use

Eleanor Cobrin knows all about the multiple errors caused by the manual typesetting method. Her business, Performance Learning Systems of Emerson, N.J., designs educational curriculums. The company had relied on traditional typesetting for years, but Cobrin was becoming annoyed with what she saw as flaws in the system. For example, each revised galley could contain new errors, not only in the text which had been reset

for corrections, but also in adjacent areas of text where words had to be hyphenated.

Two years ago, Cobrin bought a TRS-80 Model II, primarily for word processing. But she also “wanted to find out all the ways to use the computer to get our money’s worth from it.” Cobrin read several computer magazines and learned about the modem connection from personal computer to typesetter. It made her wonder whether she could set up her company’s newsletter with her TRS-80.

Flipping through the Yellow Pages, she found Grapheions Typesetting of Teaneck, N.J., which advertised that they accepted telecommunications through word processors and computer systems.

Cobrin contacted Bob Badaracco, president of Grapheions, and they experimented with several possibilities. She reports that the process wasn’t hard to set up, even though she was a brand new computer user and certainly not a software developer like Huesman. “It was a matter of my

having to learn how to do it, and his having to learn how to work with the TRS-80," she explains.

In the text, Cobrin's staff enters standard codes supplied by Graphicons for all TRS-80 computer users. These codes are simple keystroke combinations. At Graphicons, things like quotation marks and paragraph breaks are handled automatically by an interface built into the Compugraphic 8400 typesetting machine. For example, the interface recognizes two strikes of the carriage return as a paragraph break. It will also insert the proper typeset quotation mark (single or double, front or back, or apostrophe) according to the natural spacing of the text—the user need enter no additional commands. An operator scans Cobrin's text on a CRT, and from his keyboard, translates special codes into typesetting commands.

Cobrin appreciates her newfound speed. For one page of typeset copy, the entire process from transmission to film can be done in less than 15 minutes. This modem transfer actually turns the typesetting machine into a dumb terminal for Cobrin's personal computer. She also appreciates the control. "Now any mistakes are mine. If there's an error, it's mine before I send it over—but that means I don't have to worry whether additional errors are introduced." She checks a computer printout of her text and drops off a copy of it at the typesetter. The 8- to 12-page tabloid newspaper she has typeset can be coded to format whole pages, but "it's easier to paste up straight copy," Cobrin says. Badaracco agrees. "For page makeup, tight specs are required and last-minute changes are impossible."

Most of Graphicons's customers send their text with a communications package. Through research, however, Cobrin found a shortcut. She "fools her printer." She plugs her modem card into the print slot of her computer and tells the computer to

print. The data "prints" over phone lines right into the 8400 interface. According to several typesetters, this trick is fairly common among modem users. One advantage of this method is that no sign-on procedure or "handshaking" is required between the user's personal computer and the interface. Users simply send their text with a print command.

Cobrin finds that for the small amount of copy she prints, her costs compared to the old method of setting type are about the same. But she expects costs to drop significantly as she increases volume. Like Huesman, she is impressed with the quality of typesetting achieved through this method. She also cites time savings, "not more time for me personally, but less time for the process." Because of the reduction in waiting time for text to be typeset, and because of the ease of entering text with a word-processing program, she says it now takes about half as long to write and design a curriculum.

Nationwide typesetting

Still, transferring text by modem and typesetting from a personal computer meets resistance from typesetters. If your local typesetter isn't set up to receive text from your personal computer, you might consider one of the nationwide services available by modem. One such service is Intergraphics in Alexandria, Va.

Norman Bringsjord, vice president of Intergraphics, says his business started by trying to sell an InterCom 100 interface in 1977, which worked along the basic principles of the Shaffstall interface. But Intergraphics found that typesetters weren't promoting the interface's true capabilities among potential customers. Bringsjord says, "Typesetters in general didn't offer the kind of cost savings possible to the customer. They were reluctant to lower their prices enough."

As a result, Intergraphics stopped selling the interfaces to typesetters

and now offers a direct typesetting service to businesses; the firm accepts modem transmission of text for typesetting from personal computers and word processors. With 10 employees and 12 modems, Bringsjord's service averages 150 jobs a day from clients all across the country. He says his customers report savings of 50 to 80 percent compared to the manual typesetting process.

As part of Intergraphics's service, the customer first receives a book explaining codes and commands. Clients can use WordStar, Scripsit, or any word-processing software that gets all ASCII codes. (ASCII codes are the American Standard Codes for Information Interchange—most word-processing packages for personal computers use them.) Translation of codes at Intergraphics is completely automated; no operator intervenes.

According to Intergraphics, one-day turnaround is possible if a customer pays for express mail. Bringsjord claims Intergraphics requires no hard-copy version of the files. Customers can send him material at either 300 or 1200 baud.

Another service offering modem transfer of text from personal computer to typesetting equipment is Bye & Bye Incorporated of Holstein, Iowa. Company president Jim Billings says his corporation is a full print shop which offers a service called Litho/Net. Litho/Net receives modem transmissions with a TRS-80 Model III, which answers the phone and leads the customer into a menu. Copy is loaded into a 12-Mbyte hard disk drive for storage. Bye & Bye's Varityper CompEdit typesetting machine then takes copy from storage and sets it in type for the client.

With the Litho/Net service, customers are offered a few options for transmission of text. For example, a customer can leave out all the codes, explain what he wants, and let an operator enter the codes for the type-

You don't always need a typesetting machine to produce high-quality camera-ready copy.

setting machine. Another option is for the customer to embed in his text the actual commands which the typesetting machine understands—a choice made by only the most sophisticated users. The most popular option lets the user develop his own set of codes, discussing them with Litho/Net before settling on final choices. Uncoded files cost \$4 per thousand characters to set; files with codes are \$3 per thousand.

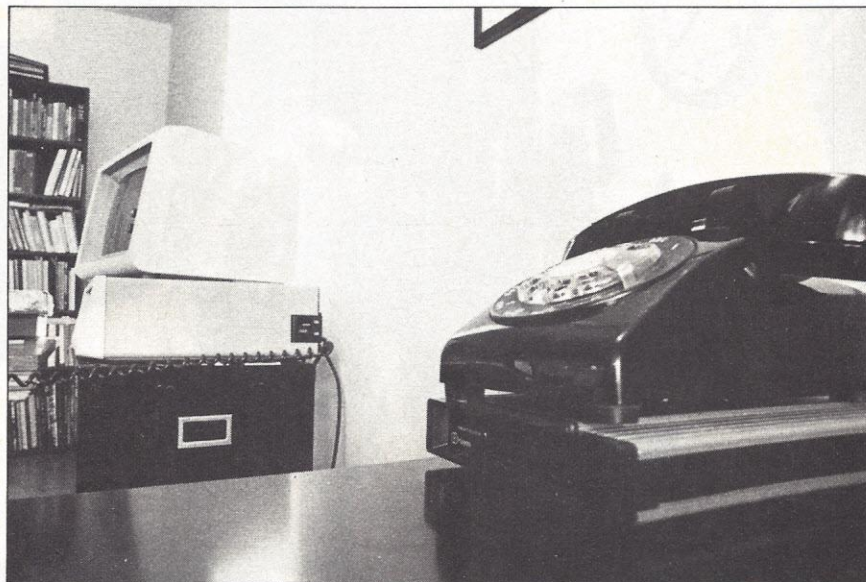
Billings's Litho/Net customers save "a good 60 to 70 percent" over the cost of their manual typesetting bills. He says phone trouble is "not really" a problem even though some customers are as far away as California. Bye & Bye will also set type from personal computer disks and can accept TRS-80 disks, DOS-PLUS, CP/M-based 5¼-inch floppies, and other formats.

In-house typesetting

Can you have your personal computer control your typesetter if you already have a typesetting machine in house? The answer is yes. A Shaffstall interface starts at around \$8500, but small companies may prefer a less expensive alternative.

Cybertext Corporation of Arcata, Calif., markets a microCOMPOSER interface system, which is intended to work with the UniSetter and all CompuWriter machines from CompuGraphic of Wilmington, Mass. The system includes a box-shaped unit which fits inside the typesetting machine and hooks to the personal computer by cable. Software comes with this system, which can accommodate several makes of personal computers including Apple II and TRS-80 Models I, II, III, 12, and 16—allowing these personal computers to control the typesetter. With a modem attached, text can also be received off the wires. Prices for the system start at \$1100.

The Cybertext interface system is also suitable for typeshop owners who want to retrofit their old equipment




Conceptual Instruments now plans to save time and money by sending text at 1200 baud. They will use a Hayes Smartmodem and an IBM Personal Computer with WordVision.

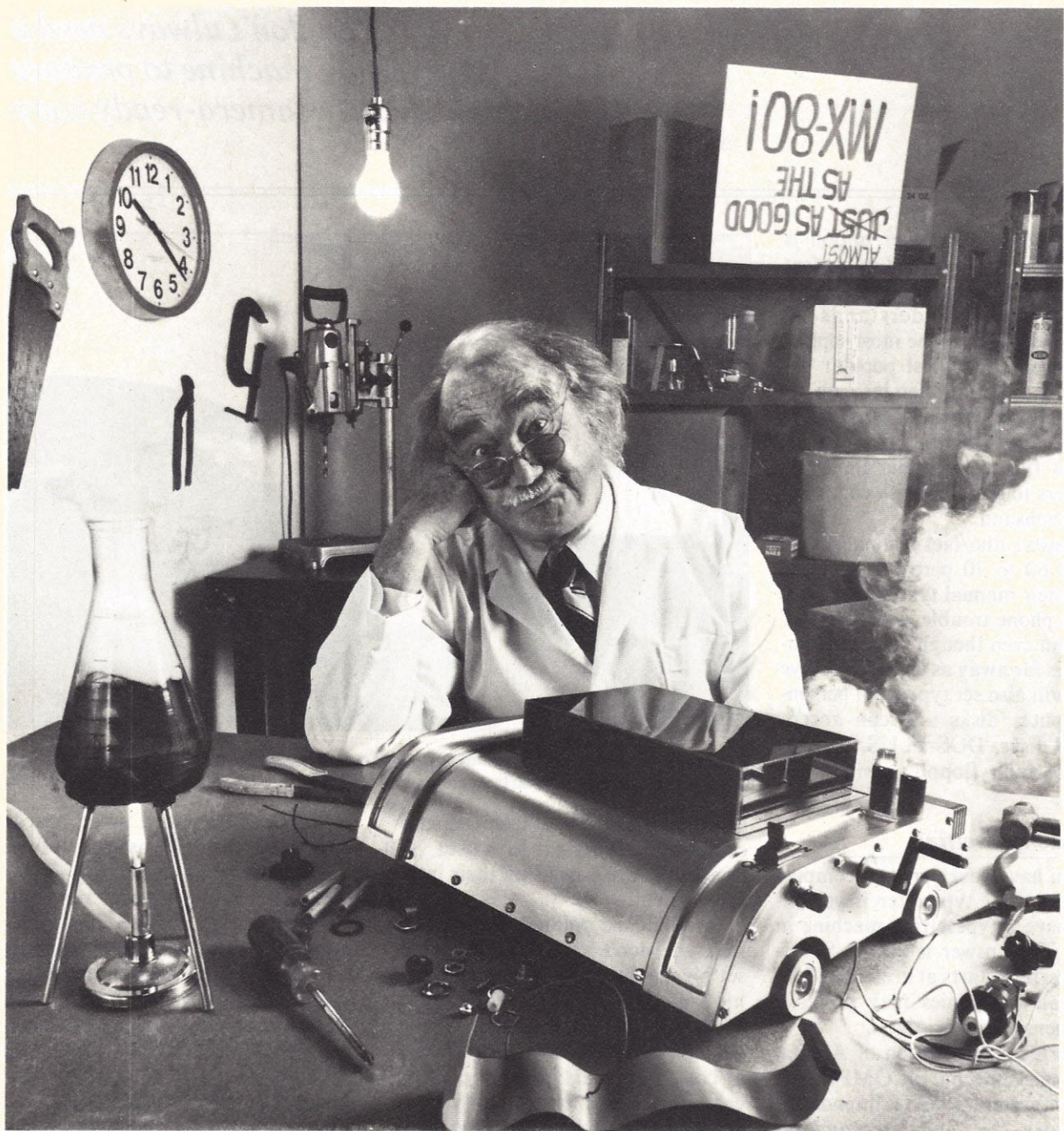
to accommodate text from personal computers. Cybertext says over 200 typesetters are now using their interface system.

It should be pointed out, though, that you don't always need a typesetting machine or modem to produce high-quality camera-ready copy. With the right letter-quality printer, you can create formatted professional copy right next to your personal computer. Some letter-quality printers give you a choice to type fonts, including such features as italics, super- and subscripts, and special characters. Some also offer proportional spacing, meaning that some letters (such as a lowercase "l") are allotted less space than others (such as a lowercase "m"), giving the copy a professional typeset appearance. Many printers can be formatted from commands you embed in your word-processing text, to create columns, centered headlines, bold-face letters, and the like. So without going to a typesetter, you can use your personal computer to give small jobs such as newsletters or in-house memos a professional typeset appearance. If printed on heavy white paper stock,

this text can be pasted up on boards for printing the same as typeset text.

Although this technology is literally at the fingertips of personal-computer users, most of them aren't aware of it. Hayes estimates that only 2 percent of the customers doing business with Meyer & Son are using personal computers to control typesetting. Hayes remarks with some surprise, "It's hard to convince customers how simple it really is." Yet Hayes sees that the awareness of this method is growing fast. This growth is reflected in the recent increase of customers sending text to his company via modem, mostly from personal computers. Some 2500 Shaffstall interfaces have been installed worldwide by typesetters large and small, with perhaps half of them in the U.S.—most of them put in service in the last three years.

As more people become aware of the cost saving, quality of copy, and time saving, personal-computer typesetting control is slowly revolutionizing ways of doing business. Clearly, it's one more way in which personal computing lets you take direct control of your work. 



For everyone who's tried
to top the MX-80, bad news.
We just did.

Epson.

The Epson MX-80 is the best-selling dot matrix impact printer in the world. It has been since its introduction. And despite the host of imitators it spawned, no one has been able to top it. Until now.

FX-80: Son of a legend.

The new Epson FX-80 is far more than just doo-dads added on to last year's model. It's the most astonishing collection of features ever assembled in a personal printer.

For starters, it's fast: 160 CPS. And clean. All the print quality Epson is famous for in a tack-sharp 9x9 matrix.

But that hardly scratches the surface.

Create your own alphabet.

With the new FX-80, you aren't limited to ASCII characters. You can create your own. Any character or symbol that can be defined in a 9x11 matrix can be added to the FX-80's already impressive library of type styles and stored in its integral 2K RAM.

So you can create "Sally's Gothic" or "Tom's Roman" just by downloading and modifying standard characters. Or you can create a custom set from scratch. Either way, you can store up to 256 new characters. And if you don't need a new alphabet, the RAM functions as a 2K data input buffer.

Who knows graphics better than Epson?

Nobody, that's who. And if you don't believe it, witness the FX-80.

With a 12K ROM capacity, the FX-80 gives you a few things the others don't. For example, not one, not two, but *seven* different dot addressable graphic modes are program

selectable. And can be mixed in the same print line. Everything from 72 DPI (dots-per-inch) Plotter Graphics to the 640 dots per line resolution designed to match the remarkable monitor clarity of the Epson QX-10 personal computer.

And *that* is in addition to an astonishing array of 136 different user-selectable type styles including Proportional, Elite and Italic as well as the more conventional faces you get on other printers.

Hard-to-beat hardware.

The FX-80 has all the hardware features you've come to know and love on the MX Series: logic seeking, bidirectional printing, the by-now-famous disposable printhead, and more.

The FX-80 features an adjustable pin platen or optional friction/tractor feed, so you can use fanfold, roll or sheet paper ... backwards or forwards. The FX-80 even gives you reverse paper feed.

And if you're printing forms, the FX-80 has a feature you're gonna love: a function that allows you to tear off the paper within one inch of the last print position.

Be the first on your block.

We'd be willing to bet that the FX-80 — like the MX-80 — will have its share of imitators. Don't be fooled. To make sure you get the genuine article, rush down to your local computer store right now and let them show you everything the FX-80 can do.

And while you're there ... ask them to show you how it works with our computers.



EPSON
EPSON AMERICA, INC.
COMPUTER PRODUCTS DIVISION

3415 Kashiwa Street
Torrance, California 90505
(213) 539-9140.
Outside California, phone
(800) 421-5426 for the
Epson dealer nearest you.

A Buyer's Guide To Fantasy/Adventure Games

A look at the world of trolls, dragons, microbes, Aztecs, mysteries, and monsters lurking within your computer

by Michael Rogers, Senior Editor

Games. For the serious user of a personal computer intent on mastering the intricacies of VisiCalc or WordStar (not to mention simply figuring out how to get his printer to do what he wants), the whole matter of games may seem a distant arena, full of confusing noise and color and better left unexplored. Yet the field of computer games is rapidly evolving. From the primitive simplicity of Pong, games are growing into an array of programming some observers feel will become a mainstream form of adult entertainment—even artistic endeavor—in the years to come.

The game shelf

Although the array of titles and packages may be overwhelming when first confronted on the pegboard racks or inside the glass display cases of computer or software stores, computer games actually fall into some fairly distinct genres—although, some are beginning to blur together. Indeed some of the most interesting new games are actually hybrids of more traditional varieties.

First and most visible are the action games, often copies or imitations of arcade games. These are the blasting, climbing, zooming, munching, beeping, jumping reflex games which, depending on your point of view, either give computer games a bad name or provide considerable short-term diversion. Action games

tend to have elaborate graphics, use joysticks or paddles for input, are relatively short, and put heavy emphasis on physical dexterity and hand-eye coordination.

Other game classes include tactical games (which are usually computerized versions of military strategy board games) and simulation games (which often border on the educational) involving situations that range from flying an airplane to running an oil company. Gambling and card games include everything from cribbage to hearts to roulette and even an elaborately graphic version of strip poker. To some, the most interesting computer games are some of the oldest and most complex of all the genres: adventure/fantasy games. These are, in their broadest terms, lengthy, intellectually challenging games requiring considerable thought and creativity on the part of the player and offering in return what seem to be satisfying rewards.

Rewards?

Before talking more about the games themselves, it's worth defining the rewards of game-playing. In terms of the arcade-type games, the answer is simple: It's a quick break, a fun release of tension, in the midst of finishing the annual report, to pop in a diskette of Frogger or Snack Attack or Choplifter and do something fairly mindless for a few minutes.

The benefits of adventure/fantasy games are more complex. Numerous educators believe the games offer real rewards. Charles Dompas, an educational consultant in Pennsylvania, has taught courses on the use of computer gaming in the classroom aimed at promoting students' interest in analytic reasoning and abstract and symbolic conceptualization. Graham Unwin, a teacher at the United Nations International School in New York, uses adventure games on an Apple II in his classroom, partly as an introduction to both the information processing and graphics capabilities of the Apple. Unwin also feels games can improve learning skills, particularly in terms of assessing the structures and possibilities inherent in the tasks they may face in the real world.

One of the more unusual uses of adventure games with children is reported by Dr. Ronald Levy, a psychiatrist who practices in upstate New York, and who has used adventure games to treat children. Levy tells of one school-age boy who had threatened suicide, yet who refused to allow a doctor to interview him. For a time it appeared that Levy's only choice would be to admit the boy to a psychiatric hospital. Then, however, Levy began to describe the adventure games that could be played on his Apple. The boy became fascinated, and started to play Wizardry.

*Some of the most interesting
new games are hybrids
of traditional varieties.*



Photos by Mikkel Aalund

During the half-hour or so that the boy played, building a set of characters and giving them names, he began to communicate with the doctor as well. By the end of the session, Levy had made real contact with the boy, and sent him home with his parents. At the end of the visit the boy said he had no intention of killing himself, because he wanted to come back and play some more. Levy has since used the games extensively with other children, in order to open up communication and provide a "projective tool" whereby, through the fantasies and the characters that the children create, they communicate their thoughts and fears.

Many adults who play adventure games will attest to benefits similar to those seen by educators and psychologists in children. The games do promote a kind of logical thinking and problem solving which has applications in the real world. A good case for some of those benefits was made

Adventure games have evolved from pure text adventures to games that draw high-resolution pictures to supplement the text.

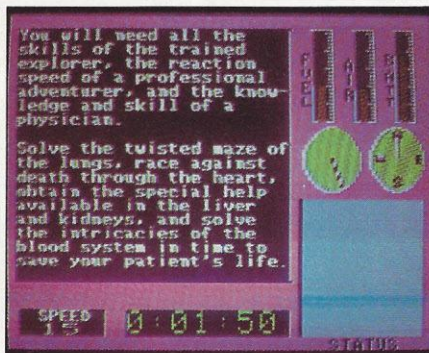
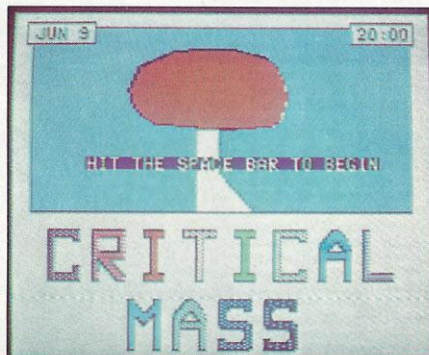
in the story "What's in a Game" in the April issue of *Personal Computing*. But those benefits—which are hard to quantify in any case—are probably not the major motivation for serious fantasy/adventure game players. The fact is these games are fun, absorbing, fascinating, challenging, and an ideal form of interactive escape. So, assuming that that's the real reason you've read this far, let's try to sort through the jungle of adventure/fantasy games that assails the senses when one first ventures into the crowded field.

A bit of history

Fantasy and adventure games are actually two different genres that were both developed in the mid-1970s. The adventure game started with a game called (logically enough) *Adventure*, written by Will Crowther and Don Woods at Stanford University for the Digital Equipment PDP-11 computer, and which rapidly achieved fame in the more arcane computer-center circles of American academe. Its first message—"You are standing at the

end of a road before a small brick building. Around you is a forest. A small stream flows out of the building and down a gully"—is familiar to all seasoned Adventure players. Now there are several versions of the original Adventure game, rewritten for microcomputers, including products from Microsoft, Apple, and Adventure International.

The minicomputer version of Adventure established the early conventions of the genre: It is all text, and set in a vast cavern wherein the player travels, encountering all sorts of trolls, dwarves, dragons, pirates, and the like, in search of various hidden treasures. The adventure takes place in a number of different "rooms," each with different properties, and the player needs to keep track of his progress from room to room by keeping a map of the play area. This concept of travel has been adopted by most subsequent adventure games, even to the use of the term "room" among aficionados as a generic description of destinations that aren't actually rooms. In terms



The addition of graphics makes the whole experience more accessible for some people.

of game structure, San Francisco Bay, for example, might be a "room." Trip Hawkins, the president of Electronic Arts and a longtime observer of the software scene, points out that, in the broadest sense, the adventure games are actually data bases, consisting of places one can go in an adventure, what each room contains, and then some program mechanism to select which room the data base opens next.

A new element was added to the straight adventure game concept with the computerization of a second game that achieved popularity in the late 1970s: *Dungeons and Dragons*. This game introduced the concept of fantasy role-playing (FRP), in which the player actually creates a character, either choosing or arbitrarily receiving certain attributes such as strength, wisdom, or magic powers. The player retains that character in the passage through the fantasy/adventure, and the character's strength and abilities may change during the game. (Hawkins notes that for many of the adolescents to whom the game initially appealed, it functioned as something of a "rite of passage" into adulthood.)

The computer, with its ability to keep track of all these character attributes automatically, really got the FRP games off the ground. In a number of these adventures, the player has to develop and test a character in one game before going on to the next. This step is taken very seriously—indeed, it can be a shattering blow to lose a character one has developed over time. An interesting controversy has arisen recently over *Wizardry*, a popular FRP game published by Sir-Tech, and which has a sequel called *Knight of Diamonds* that uses characters developed in the first scenario. Another software publisher has introduced a program that allows frustrated *Wizardry* players to go ahead and build their own characters—endowing them with sufficient strength, etc., to proceed through the

second game without difficulty. The publishers of *Wizardry* take a dim view of these "cheat programs" (as they call them)—and have even inserted warnings against their use in packages of *Wizardry*, stating that "they may substantially reduce your playing pleasure."

The current market

Probably the best way to illustrate what to look for in the adventure game market is to talk about some specific programs. That's tougher than it sounds, because the adventure game business is already crammed with titles, and new ones are appearing all the time. That's why we've departed from our usual buyer's guide format—there's simply no practical way to list all the companies which produce adventure/fantasy games. Also, by the time this article appears, new companies will probably have emerged. Adventure games of various kinds can also be found on several of the major information utilities, including CompuServe and The Source. (The Source offers a version of *Adventure*, by the way, that will give the curious some flavor of what the game was like when played in the original minicomputer version in the 1970s.)

The games we've chosen to discuss here illustrate a specific point or trend in the market; our listing is by no means exhaustive, but is rather intended to give the reader an idea of what to expect in this field, and what kind of questions to ask.

Text vs. graphics

As mentioned earlier, the first adventure games consisted entirely of text. The screen would describe your position—"You are standing in front of an immense oaken door." And then, using a limited vocabulary, you would tell the computer what you wanted to do—"Open door." The computer would then go away briefly (depending on how fast the program ran) and return to announce that,

say, the door won't open. Or that there's a terrible troll on the other side and your character is now dead.

Now, graphics, animation, and even sound effects are beginning to show up in the adventure genre, drawing a mixed reaction from adventure enthusiasts. Even in the best of the new graphics games, in the sharpest high-resolution color possible, the imagery is often not terribly evocative, limited as it is (for the most part) to 8-bit processors and relatively small computer memories. In addition, color graphics and animation tend to take up a lot of memory space—meaning, from the programmer's point of view, that one has to give up some flexibility and depth in the game structure itself in order to make room for the flashy stuff. Old-time adventure enthusiasts will argue that it's preferable for castles, dungeons, monsters, and other props to be created entirely in the player's imagination. On the other hand, it's that requirement of suspension of disbelief that has kept many of the less fantasy-oriented computer owners out of the adventure game market. For some people, the addition of graphics makes the whole experience somehow more accessible. (Scott Adams, one of the first adventure game authors, whose *Adventure International* catalog now contains nearly two hundred titles, was asked recently whether the new directions of the adventure games might open up the field to more of a mass market. "It is a mass market," he replied. "We sell hundreds of thousands of these things.")

At any rate, the argument over text vs. text-plus-graphics is bound to continue, although the movement is clearly toward the increasing use of graphics. But a number of classic games remain all text, and this leads to one important attribute of both text and graphics approaches—the power and flexibility of the "parser." This refers to the game program's ability to understand what you're

saying—the breadth of vocabulary and syntax the program will accept as input. The Zork series from Infocom is considered by many to be an exceptional example of parsing, with a vocabulary of more than 600 words, and a certain degree of flexibility in how those words are put together. One can, for example, address the computer in complete sentences, and when the program doesn't recognize a word, it tells you which one isn't in the vocabulary.

Zork, by the way, is a good example of just how absorbing adventure games can be, in that it has actually spawned its own users' group. This group, which is not affiliated with the game's publisher, produces a series of elaborate maps to the underground world where the game takes place, as well as very clever books of clues. The clues in the book are printed in invisible ink which becomes visible only when a special pen is passed over it—thus ensuring that the player's enjoyment of the game's puzzles isn't diminished by accidentally seeing a clue he wasn't looking for.

Good parsing, then, is important in a text adventure game. So is good documentation, for, considering that it's up to the player to create the look of the fantasy world, any additional help the author can provide is welcome. In addition, the operation of some of these games—knowing what words one can use and what syntax is acceptable—can be complex.

To minimize the complexity, game documentation often contains additional fiction that helps set the scene, or explains some of the mythology behind the game. The documentation for Epyx's *Temple of Apshai* is a good example; it contains a nice overview of the adventure game genre, along with detailed instructions and several pieces of imaginative prose about characters who will be encountered in the game. A particularly noteworthy booklet arrives with Phoenix Software's *Birth of the Phoenix*, a game the publishers call a

"tutorial adventure." The game itself is aimed at beginning adventurers, covering most of the typical situations found in adventures, and the accompanying manual features condensed advice on techniques applicable to adventure games in general. (Along related lines, Sierra On-Line offers an adventure game specifically aimed at children, called *Troll's Tale*.)

If this talk of tutorials and users' groups makes these games sound complicated, it's because they are. While it's hard to give a definite figure, the average adventure game probably takes about a month to complete. Experienced players who know their way around mazes and the other tricks of the trade may play more quickly, but 30-40 hours on a game is usually standard. (The amount of time helps justify the prices, which begin around \$20, cluster at \$30-\$35, and occasionally run as high as \$50 or \$60.) This talk of the time required to play these games leads to another important feature to look for in adventure games: the ability to "save" one's character and position in the game, enabling the player to go away and tend to more worldly pursuits like making a living.

"Save" capabilities vary from game to game. Some games let you save your position on the actual game disk itself, although you may then have to start at the beginning of the game each time you return. It's easier going, of course, because you've learned your way around the game, and you can retain whatever characteristics, treasures, etc. your character may have earned. This is also important because increasing numbers of adventure games are designed to create a different maze or puzzle when a new game is started. With the save feature, you're allowed to come back to the same game you left, even though you may have to start at the beginning of it. Refinements in the save capability allow more than one person to save a game—so that

more than one person can have a game in progress at a time. Finally, some games allow multiple saves on a single disk (you usually have to use a second disk to do this). This allows you to save your position at several points in the game, so if you make some fatal error late in the game, you're not completely wiped out. Your character still exists, and you can pick up the game somewhere before your bad decision and try a different strategy.

Graphics and action

All-text adventures are hardly disappearing; in the sci-fi subgenre, for example, Infocom's *Starcross* is a recent and successful addition to text-only games. But graphics are appearing more and more. Sometimes they're updates of older games, such as Quality Software's *Beneath Apple Manor*. One of the granddaddies of adventure game authors, Scott Adams, has released some of his classic *Adventureland* series with added color graphics and sound, but also the capability to turn off the graphics, according to preference. The majority of new games, at this point, include some graphics. The quality of those graphics and the smoothness with which they are integrated with the text seem to be improving monthly. Some recent releases which typify the rapid improvement in graphics are Ultrasoft's *Mask of the Sun*, Phoenix Software's cartoon-like *Sherwood Forest*, and Penguin Software's well-detailed *Transylvania*.

Once one has graphics on-screen, animation can't be far behind, and indeed, animation plus arcade-style action is starting to show up. Three recent samples of this trend are Synergistic Software's *Adventure to Atlantis*, Quality Software's *Ali Baba*, and Datamost's *Aztec*. *Aztec*, for example, is an adventure in which the player takes the role of a swash-buckling archeologist, not unlike the character in "*Raiders of the Lost Ark*," and sets out to search a mys-

*Once one has graphics
on screen, animation
can't be far behind.*

A BAKER'S DOZEN POPULAR ADVENTURE/FANTASY GAMES

AZTEC
Datamost Inc.
9748 Cozycroft Ave.
Chatsworth, CA 91311
(213) 709-1202
Apple II Plus, IIe
\$39.95

A real-time adventure in which there's a treasure buried beneath the pyramid. The player goes from room to room and must overpower evil creatures and obstacles. The Aztec hero can run, jump, crawl, and use his weapons to attack, hit, and conquer. When the player reaches the treasure he must get it out of the pyramid. If he does that, he can begin again, but the obstacles and events will be different.

BENEATH APPLE MANOR
Quality Software Inc.
6660 Reseda Blvd., Suite 105
Reseda, CA 91335
(213) 344-6599
Apple II, II Plus, IIe
\$32.95

The player descends beneath Apple Manor into an underground maze of corridors, rooms, and passages. He is in quest of the treasure—the golden apple. Strategy is an important element in reaching the treasure.

CABUL SPY
Sirius
10364 Rockingham Dr.
Sacramento, CA 95827
(916) 366-1195
Apple II, II Plus, IIe, III; Atari 800;
Commodore 64
\$39.95

An adventure in which the player must find the sword of Myraglyn and return it to the altar. There are numerous challenges the player must deal with in his quest.

CAMPAIGN TRILOGY
Synergistic Software
830 N. Riverside Dr., Suite 201
Renton, WA 98055
(206) 226-3216
Apple II, II Plus, IIe
\$29.95

Trilogy includes Dungeon Campaign, Wilderness Campaign, and Sorcerer's Challenge. In Dungeon Campaign the player explores and must escape from an underground labyrinth filled with treasures and hazards. In Wilderness Campaign the player must gather men, armor, and weapons to defeat evil Necromancer and save the empire of Draconia. And in Sorcerer's Challenge two sorcerers stage a fight to determine who will rule the kingdom of Thessalona. Game paddles are required for this one.

CASTLE WOLFENSTEIN
Muse Software
347 No. Charles St.
Baltimore, MD 21701
(301) 659-7212
Apple II, IIe; Atari 400, 800 with 32k
\$29.95

Takes place in a German castle during the Nazi regime. The player is a soldier trying to escape. Player must make it past guards, find war plans, and escape. A real-life simulation with high-resolution graphics that can be played with joysticks, keyboard, or paddles.

DARK CRYSTAL
Sierra On-Line Corp.
36575 Mudge Ranch Road
Coarsegold, CA 93614
(209) 683-6858

Apple; Atari; Commodore; IBM Personal Computer to come
\$39.95 (includes poster)
Parallels Jim Hensen's Muppet movie theme of good vs. evil. This is another world where good and evil are split—good creatures and bad. The good creatures must get the Dark Crystal shard (the controlling force) back into the crystal; otherwise evil will reign. The graphics were done by Hensen Associates; Sierra's artists adapted them to computers.

DEADLINE
Infocom Inc.
55 Wheeler St.
Cambridge, MA 02138
(617) 492-1031
Atari 400, 800; Apple; IBM Personal Computer; Commodore 64; DEC Rainbow, PDP 11; NEC PC 8000, Advanced Personal Computer; TI Professional; TRS-80 I, II, III; CP/M
\$49.95; \$59.95 for CP/M, DEC PDP 11, NEC Advanced with 8-inch disks

A mystery/adventure with player/computer interaction. This is a "whodunit" modeled after Agatha Christie stories. A dead body is discovered in a locked room. The player is given excerpts from interviews with all the characters; he is the investigator hired to solve the murder. He must explore the clues and come up with the means, method, and mode of the murder. To do this, he is supplied with the autopsy and other reports.

PRISONER 2
Edu-Ware
28035 Dorothy
Agoura, CA 91301
(213) 706-0661
Apple II, II Plus, IIe; Franklin Ace; Atari 800
\$32.95

In this fantasy/adventure the player is suddenly placed on The Island, a futuristic society controlled by a mysterious Number One. The caretaker is a bureaucrat who is never seen, but who manipulates the player through propaganda and other devices. The player must escape, but rulers of The Island want his resignation code. If they get it, the player is imprisoned on The Island. The player must constantly try to outwit the caretaker so as not to divulge the code.

SCOTT ADAMS ADVENTURE SERIES
Adventure International
507 East St.
P.O. Box 3435
Longwood, FL 32750
(305) 862-6917

Apple II, IIe; Atari 400, 800; TI 99/4; Commodore VIC-20; North Star Horizon, Advantage; TRS-80 I, II, III; CP/M
\$39.95 for Atari and Apple with graphics; \$39.95 for three adventures for TRS-80 I, II (no graphics); \$49.95 for North Star; \$129.95 for TRS-80 II and CP/M

A popular series in which the player must go through either rooms or outdoor areas and overcome or conquer obstacles in order to stay alive or reach a goal.

SHAMUS
Synapse Software
5327 Jacuzzi St., Suite 1
Richmond, CA 94804
(415) 527-7751

Atari 400, 800; Apple II, II Plus, IIe
\$44.95 (Atari cartridge); \$34.95 Apple
An adventure game in which the player controls a detective on-screen. The player must shoot his way past aliens to try to reach the point of a final showdown with The Shadow. On the way the player must collect the correct keys in order to unlock passageways to rooms.

TEMPLE OF APSHAI
Epyx
1043 Kiel Court
Sunnyvale, CA 94086
(408) 745-0700
Apple II, II Plus, IIe; Atari 400, 800; TRS-80 I, II, III; Commodore 64; IBM Personal Computer
\$39.95

Player is led through a series of dungeons, collecting treasures, and fighting demons and monsters. The object is to collect as much treasure as possible and to work your way out of the dungeons, building your character strength and wisdom through victories over monsters and demons.

WIZARDRY
Sir-Tech Software Inc.
6 Main St.
Ogdensburg, NY 13669
(315) 393-6633
Apple II, IIe, III; IBM Personal Computer
\$49.95; \$59.95
This is a fantasy in which the player creates and names characters. He must go through a 10-level maze and eventually defeat Werdna, a wizard. Obstacles must be crossed in order to get to each successive stage.

ZORK 1
Infocom Inc.
55 Wheeler St.
Cambridge, MA 02138
(617) 492-1031
Atari 400, 800; Apple; IBM Personal Computer; Commodore 64; DEC Rainbow, PDP 11; NEC PC 8000, Advanced Personal Computer; TI Professional; TRS-80 I, II, III; CP/M
\$39.95; \$49.95 for CP/M, DEC PDP 11, NEC Advanced with 8-inch disks
This fantasy/adventure requires interaction of player and computer. Its basis is the great underground empire of Zork 1. The player explores rooms through solving puzzles; each success gets the player to new areas to explore.

This list is based in part, on an April 1983 survey conducted by Computer Merchandising and Software Merchandising 15720 Ventura Blvd., Encino, CA 91436.

WESTICO — The Software Express Service that really delivers:

SOFTWARE FOR PROFESSIONALS

Designed for 8 bit and 16 bit personal computers.

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“Ultimately, it would be nice to have computer fantasies as rich as your dreams.”

SPECIAL REPORT

terious pyramid for a priceless idol. As is typical of the genre, the pyramid has many rooms filled with hazards ranging from cobras to trap doors, and as the player proceeds he can gain “strength” by finding and using guns, bullets, machetes, etc. What makes this game different is that there is actually a little image of the character on screen, and by using the keyboard, you control his movements through the maze. Quick reflexes (as in arcade games) are occasionally required during combat, but there’s still an intellectual puzzle-solving quality to the game.

Another logical add-on with animation is sound, and adventure games are making increasing use of sound effects. One of the most advanced examples of this trend is Computer Application’s *Dunzhin* for the IBM Personal Computer. Although it’s not an animated game it uses the additional memory of the Personal Computer (when equipped with 128k of RAM) to store synthesized voices which sound at appropriate points in the game—an early hint of just what will be possible in the game business when large computer memories become more common.

Breaking new ground

Until recently, adventure games tended to restrict themselves to traditional fantasy-type settings—caves, trolls, princesses, wizards, dragons—with occasional forays into science-fiction that were, for the most part, more akin to fantasy. The format of rooms, clues, puzzles, mazes, and variable character traits has also been fairly constant. Lately, however, some interesting variations have appeared, some of which hint at where these games may be heading, and what kind of new products one might begin to look for in the stores.

One new approach is Infocom’s *Deadline*, an all-text game that comes impressively packed with a whole set of supporting documents. In this game, you’re a detective out to

solve a murder within a 12-hour time limit. The documents at your disposal include a coroner’s report, photographs, interviews, a casebook and other clues. It’s similar to old-style adventure games in that you end up mapping out the murder house as you search for clues, but the context is sufficiently different to attract a new range of players.

Epyx’s *Crush, Crumble and Chomp!* adds a different twist, and a touch of humor, to the tradition by making the player a monster who’s out to perform the activities of the title upon the major cities of the world. This game has sound, high-resolution color graphics, and can be set up for various scenarios that make it a shorter (10 minutes to one hour) experience than the long-term adventure games; the fact that many variables can be altered, however, means it can be played a number of times.

Critical Mass from Sirius Software also shifts the boundaries of the adventure game, with color and some fast action sequences, all based on the player’s attempt to stop a madman from destroying the world’s five largest cities with nuclear weapons. The player travels around the globe, and the plotting of the game takes advantage of this diversity to add some innovative twists.


Edu-Ware’s *Prisoner 2* stretches the genre by borrowing heavily from the television series “The Prisoner,” which gained something of a cult following with its relentlessly mysterious, psychologically complex plotting. Indeed, the Edu-Ware game stretches the genre so significantly that it’s difficult to describe briefly; suffice it to say that it’s a complex game in which little is known and the player’s goal is to escape from an unnamed island with his individuality intact.

Genre-stretching, color graphics, sound, and arcade action are all present in Synergistic Software’s *Microbe*, along with yet another element: education. In this game the

player is the pilot of a tiny submarine injected into the bloodstream of a sick human, battling lymphocytes and weaving through baffling capillary structures in order to save the patient. Each game (patient) is different, and the program allows the player to choose his level of medical expertise (if you say you’re a medical student or doctor, it won’t help you as much with diagnoses or prescriptions). Co-authored by a physician, *Microbe* actually contains a remarkable amount of medical information—enough, in fact, that the publisher felt compelled to include a disclaimer that this particular adventure game shouldn’t be used to diagnose one’s own ills.

The future

These games are only a sampling of what’s available, but they provide a glimpse of how varied a selection has grown from the traditional adventure game. It’s an exciting time in the game industry, as authors and publishers really begin to look on the computer game as a medium without constraints—an entirely new form just waiting for definition. Robert Clardy, an innovative games author, has likened the impact of computers on gaming to the impact of sound on movies. “The most interesting game developments in the next few years,” he says, “will be those which avoid slavish adherence to artificial categories and the imitation of past successes.” Trip Hawkins of Electronic Arts sees almost limitless potential for computer software as an entertainment medium. “One direction,” he says, “will be getting the computer medium itself to be richer. Right now it’s fairly abstract, and you have to use your imagination. But ultimately, it would be nice to have computer fantasies as rich as your dreams.”

If indeed computer fantasies could approximate people’s dreams, the possibilities for games appear to be unbounded. So it’s probably safe to say you ain’t seen nothin’ yet. 

My Computer, My Teacher

The personal computers are coming—into the schools. And recent studies indicate that computer-aided instruction helps students learn

by Trudy E. Bell, Associate Editor

Students of all ages in the Houston Independent School District in Houston, Texas sit before Apple II personal computers learning mathematics, reading, science, language arts, accounting, and business education. Performance is impressive. In the words of Dr. Billy Reagan, general superintendent of the district, "We've done a lot of research here on computer-aided instruction, and we have learned that we can do in 10 to 12 minutes what ordinarily takes 50 minutes in a class."

Four thousand miles to the north, in Alaska, students in remote high schools use Apple IIs in six courses of Individualized Study by Technology: Alaska history, English, developmental reading, general mathematics, general science, and U.S. history. In pilot tests of the courses, 74 percent of the students preferred learning by computer to all other methods of instruction.

These scenes aren't isolated examples. The fastest-growing segment of the personal-computing market is educational software and hardware for use in schools. A report on educational software published in 1982 by Strategic Inc. of San Jose, Calif., predicts demand for computers in schools will triple by 1985, to an installed base of more than 1.6 million personal computers. Another survey conducted by the market consulting firm Future Computing, Inc. in

Dallas, Texas, projected that the market for educational software will increase by a factor of 14 by 1987—a compound annual growth rate of 71 percent.

Why are so many schools eagerly investing in personal computers? Although some of these computers are being used to teach computer literacy and programming, others are being put to work as supplemental teaching tools for subjects other than computing. They are functioning as personal instructors which help students hone their skills in traditional subjects like English grammar, history, or geography. It's this role of the personal computer as coach and tutor that's causing thoughtful teachers and parents to ask: Just how effective is computer-aided instruction? Is there any evidence that personal computers really help students learn?

Studying the studies

Computer-aided instruction is still a relatively new field—so new that until recently little hard evidence had been gathered as to its effectiveness. However, within the past year three major research studies have been published. These studies show that computer-aided instruction can dramatically improve a student's learning, retention, achievement, and attitude...under the right conditions. And the lessons drawn from these studies in schools may also ap-

ply to computer-assisted learning in the workplace or at home.

To understand these studies, some definitions are needed. In the literature three similar-sounding terms are bandied about, sometimes without much explanation. Here are some clarifications:

Computer-aided instruction (often abbreviated to CAI) is the process by which a student learns with the direct aid of a computer. There are several forms of CAI, the most common being drill and practice, in which the computer presents flashcard-like exercises to help the student become more familiar with the subject. Another common form of CAI is the tutorial, in which the computer guides the student through a program of learning, setting the pace to suit the student.

Computer-managed instruction (CMI) involves the computer in an administrative function only. The student may never see or work with the computer; the study materials may consist of standard media such as books, videocassettes, study modules, and audiovisual aids. The computer scores tests, interprets results, advises the student what to do next, and manages the student's records.

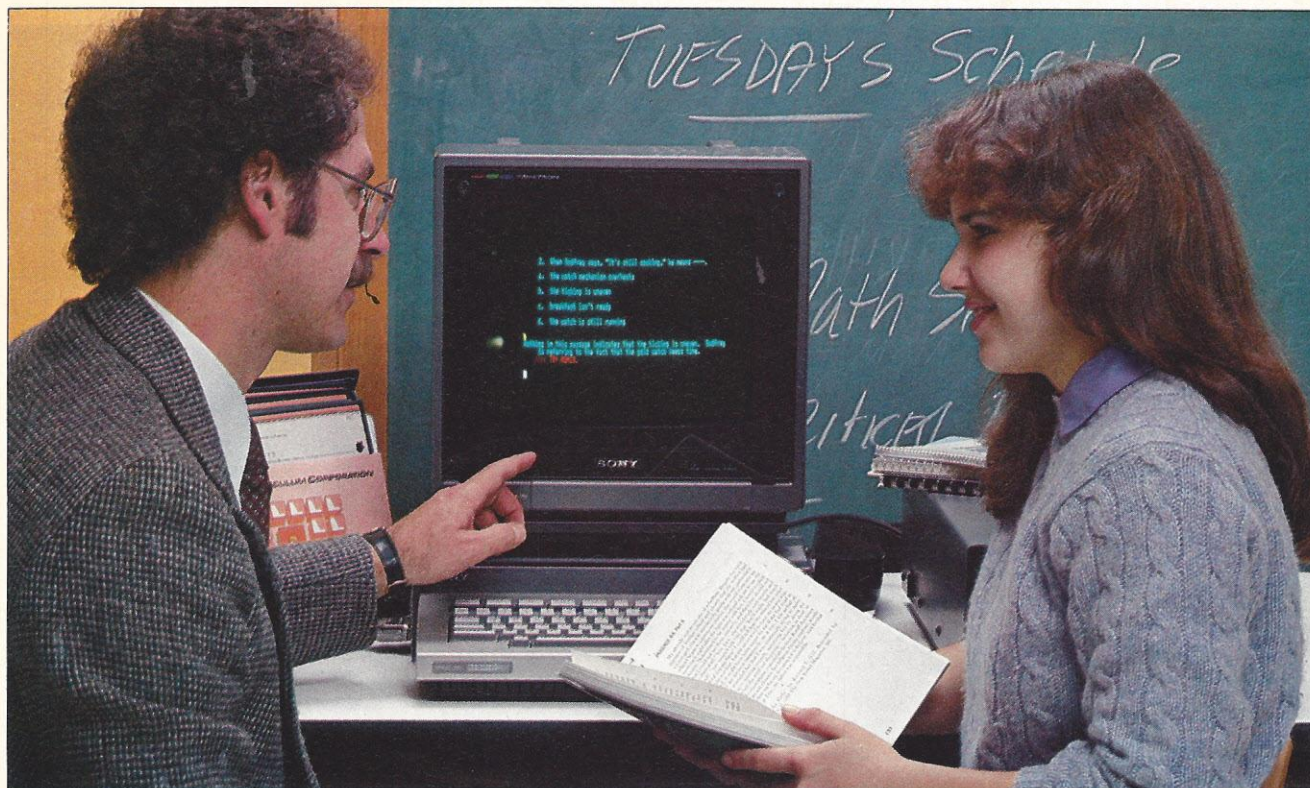
Computer-based instruction and computer-based teaching are generic terms which encompass all of the above.

The first study is a 260-page over-

*Just how effective
is computer-aided
instruction?*



Photos courtesy of Computer Curriculum Corp. of Palo Alto, CA



Computer-assisted instruction can test a student's comprehension by asking questions and giving instant response.

view entitled *Informational Technology and Its Impact on American Education*, published last summer by the Office of Technology Assessment (OTA), which is the analytical arm of the U.S. Congress. As the title indicates, the OTA report evaluates more than computers in the classroom. Computer-aided instruction is reviewed in the context of a wide variety of electronic learning technology.

The report cites four reasons for the increased interest in computer-aided instruction and other forms of interactive electronic learning in schools. First, declining costs are making personal computers more affordable to schools. Second, the escalating costs of traditional labor-intensive classroom teaching makes this inexpensive technology even more attractive as a way of giving students individualized instruction. Third, an improved understanding of

how to create instructional packages is encouraging teachers to explore the new technology. And finally, the development of ways to link computers with other technologies such as videodisks and interactive cable television is offering schools a wide array of new teaching aids.

After reviewing a number of studies evaluating computer-aided instruction and other educational technology, the OTA report concludes: "There is a substantial amount of agreement that, for many educational applications, information technology can be an effective and economical tool for instruction." That conclusion is based on a number of observations including the fact that "Research exists, some of it dating back years, to suggest that students do learn as well or better from educational technology than from conventional means. Little evidence exists to the contrary."

The second study, published in the *Journal of Educational Psychology* this spring, is an analysis by Dr. James A. Kulik and two of his colleagues at the Center for Research on Learning and Teaching at the University of Michigan. They spent over a year combing data bases and other literature to find every research project ever done on computer-based instruction. Their mission was to see whether there were common trends running through the results. They examined more than 300 research projects which had been administered around the U.S. since the middle 1970s, but were forced to reject some 250 of them as having "crippling methodological flaws" or other problems.

When Kulik and his colleagues compared the findings from the remaining 51 evaluations of computer-based instruction in grades 6 through 12, they discovered that those inde-

Results are consistent: Computer-aided instruction works.

pendent studies shared a remarkable and dramatic conclusion. In Kulik's words, "Our analysis showed that computer-based teaching raised final examination scores . . . from the 50th to the 63rd percentile"—that is, 63 percent of the kids who learned with CAI did better on final exams than the average kid in a conventional class. "Computer-based teaching also raised scores on follow-up examinations given several months after the completion of instruction, but these retention effects were not as clear as the immediate effects of computer-based instruction. Finally . . . the computer substantially reduced the amount of time that the students needed for learning."

Kulik's analysis did not differentiate between the teaching functions of CAI and the administrative functions of CMI. In fact, the 51 studies he examined "showed no significant differences between the uses—there seemed to be about the same degree of effectiveness." Why should the results be so similar if in one case the student is learning at the computer and in the other case the computer is only keeping the student's records and tests? Replies Kulik: "It may be that whether or not you use the computer to learn isn't quite as important as whether computers are being used at all. Any use of a computer to teach or grade material may force people to plan more carefully when they design the learning modules, and to develop the instruction better, in a way that ordinary classroom teaching doesn't."

Even more striking for Kulik was the discovery that the 51 studies seemed to verify a prediction he'd made in 1981, which suggested that computer-based teaching would be more effective at the secondary level than it has been at the college level. Writes Kulik: "This is exactly what we found."

Kulik and his colleagues didn't hazard a guess as to whether education with computers might be even

more effective with even younger students. But evidence for that theory emerges from the third major study.

This third study was a four-year research project conducted by the Educational Testing Service (ETS) in New Jersey—the same folks who bring us the Scholastic Aptitude Test (S.A.T.), the Graduate Record Exam (G.R.E.), and various other achievement tests. The ETS teamed up with the Los Angeles Unified School District in 1976 to install computer-assisted instruction labs using Computer Curriculum Corp.'s hardware and software in four elementary schools. In each of the schools half of the first through sixth graders were given access to computer-assisted drill and practice, while the other half were not. The chosen students were allotted 20 minutes of CAI per day in two 10-minute sessions, divided in various ways between math, reading, and language arts. The level at which each student worked was determined by his or her performance, not by nominal grade level. Children in two other schools without CAI labs were observed as controls.

From 1977 to 1980 ETS researchers monitored the daily performance of several thousand children, and tabulated scores from standard tests twice each year. The researchers also followed each group of children through the entire study to watch for any changes over the years.

According to Marjorie Ragosta, Research Scientist for ETS and the director of the project, "We got very strong results with increases each year. At the end of the first year, the CAI math students were at the 64th percentile compared to the 50th percentile for the non-CAI students. At the end of the second year the CAI students were in the 71st percentile; at the end of the third year they were in the 76th percentile. In other words, the increase in their test scores was steady over several years." The results were similar for reading and for language arts. And those students

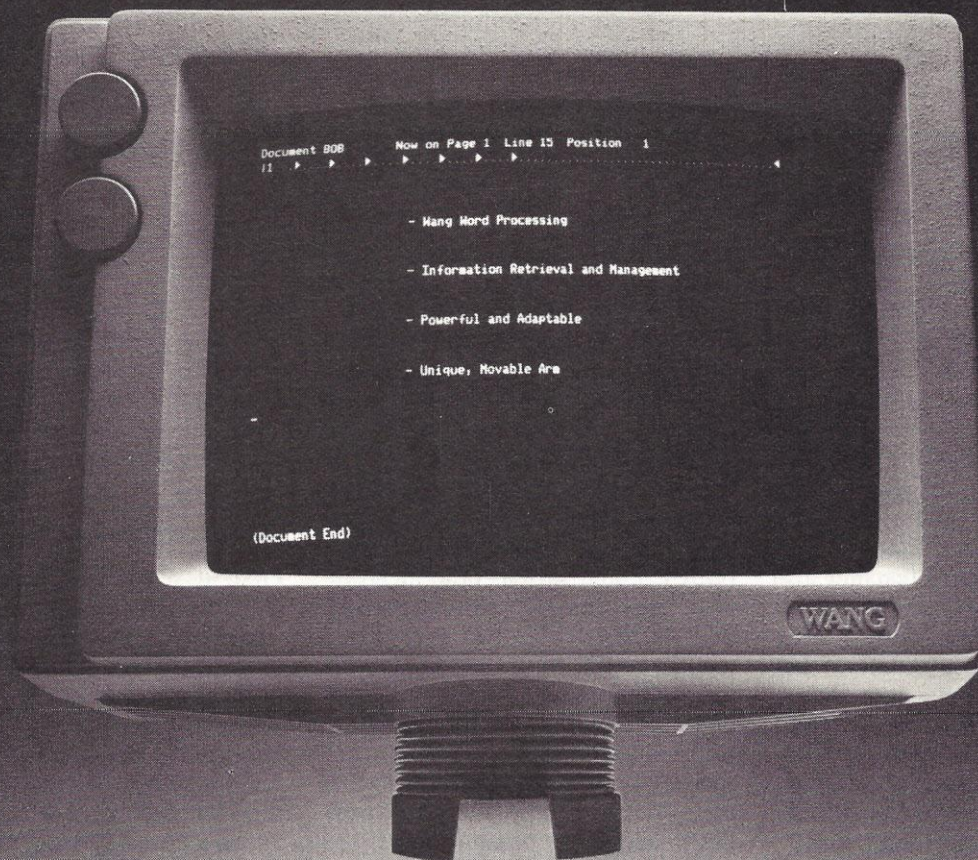
who had 20 minutes of math CAI each day scored significantly higher than those who had only 10 minutes.

Although the studies differ in their approach, their results are consistent: Computer-assisted instruction works.

What it all means

First, it seems that CAI gives students the opportunity to practice what they've learned, and to get better at it. "There's a lot to be said for drill and practice in honing children's minds, in getting them into the swing of doing the work," Ragosta observes. Kulik's study shows that the same is true for older students. The results are concrete: measurable increases in achievement and test scores.

Second, in some circumstances CAI may teach students better study habits. This result is suggested by a factor noted in all three reports: CAI's effectiveness in improving the academic performance of culturally disadvantaged students. Kulik noted this in several of the studies he analyzed: "The effects of computer-based teaching seemed especially clear in studies of disadvantaged and low-aptitude students . . . whereas effects appeared to be much smaller in studies of talented students." Similarly, the ETS study in Los Angeles revealed that CAI made the most difference for students from low-income homes eligible for Federal educational assistance. "We had a lot of Title I kids," Ragosta recalls. "Maybe those children aren't used to being so successful, and maybe the fact that now they had the opportunity to get good scores, they really wanted them. I've never been in a circumstance where so many of the students wanted to be perfect." The OTA report also cited several studies which showed that "through the detailed and highly individualized feedback provided by the computer, computer-aided instruction in schools helped students acquire habits of precision in their work."



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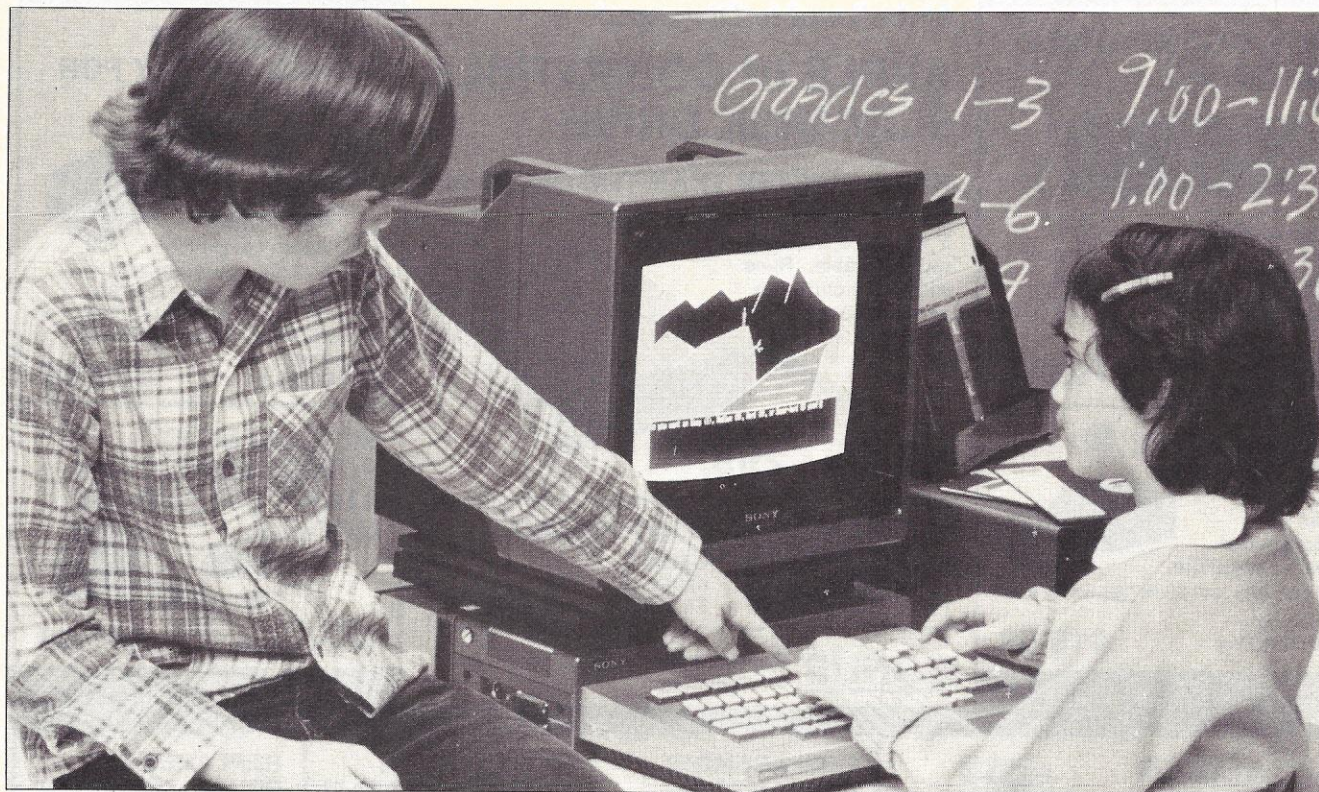
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The rapid growth of computers in schools indicates they are the wave of the future.

EDUCATION



Computers allow students to learn at their own pace. They also seem to encourage kids to help each other learn.

Third, CAI seemed to motivate students. Reports Kulik: "Students who were taught on computers developed very positive attitudes towards the computer and also gave favorable ratings to the computer-based courses they were taking." Ragosta found the ETS results somewhat more poignant. "We did several attitudinal studies. All of them showed that CAI had positive effects on the children's attitude toward the computer—in fact, the non-CAI students wanted to be on the computer. By and large the children loved the computer." The OTA report also pointed to studies of disadvantaged students that showed that computer-aided instruction increased their motivation to learn while reducing vandalism.

All these studies gathered more information from CAI programs for terminals than for personal computers, for the simple reason that personal computers have only recently en-

tered schools in large numbers. They're such a new phenomenon that there simply hasn't been enough time yet to research them. However, the rapid growth of personal computers in schools indicates they are the wave of the future—and schools are thus well advised to take a lesson from the past. CAI can be very effective—especially if the software designed for personal computers takes advantage of what has been learned from a decade with terminals.

Marjorie Ragosta has reservations about adapting software devised for the larger systems to a format suitable for personal computers. "Even if you take exactly the same material and chop it up on floppies, you have to limit the material somehow on each disk—by grade level, subject matter, or whatever. And that limits the program's effectiveness in responding to the performance of the child. Also, there are many micro

software packages out now that might be useful to schools, but the use of those software packages differs from manufacturer to manufacturer. Software for micros will have to be more systematically organized before it's truly useful in the classroom. Schools just cannot continue to use thousands of programs with no consistency; the teacher has to spend a lot of time just figuring out what's going on. If you have teachers using computers and those teachers are not computer experts, every time there's a change in just the way you have to sign on, it causes a lot of grief."

The design of the instructional material may also be crucial to effectiveness as a motivator. According to Dr. Terri Rosegrant, Assistant Professor of Elementary Education at Arizona State University, some of the attitudinal changes may have come about because mastery of the computer can give students a sense of

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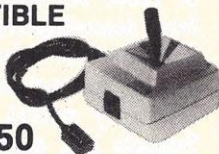
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“The next step is to take advantage of the new medium to teach new things.”



Computer-assisted instruction seems to be highly effective for very young children learning basic skills.

control over their environment. “If a child feels incompetent, he begins to feel out of control in his environment,” explains Rosegrant. “Feeling out of control can trigger a cycle of failure; since he can’t figure out how to interact successfully, he tends to give up on it all.” Operating on that premise, Rosegrant has spent the past two years developing a simple word-processing program for children under the age of 10, and monitoring its performance in helping them learn to read and write. The program works in concert with a voice synthesizer that pronounces letters and words as the child types them onto the videoterminal. The program can also read aloud the text the child has written, highlighting each word as it’s pronounced. The program, called Talking Screen, has been particularly effective in helping learning-disabled kids. And, says Rosegrant, “part of what happens is


that with growing competence, the child’s self-image and self-concept changes. It’s not just the magic of the computer.”

What the future may hold

So what’s the verdict on computer-aided instruction and current educational software? Mary Alice White, Professor of Psychology and Director of the Electronic Learning Laboratory at Teacher’s College of Columbia University, agrees with the studies by the OTA, Kulik, and the ETS. “Evidence aside from those three studies is all anecdotal, but you very rarely hear of a child who doesn’t like it, which is more than is generally true for traditional instruction.”

White herself has a grander vision, an undeniably forward-looking point of view. “I think the very idea of computer-aided instruction is all wrong. That name implies that it’s

traditional instruction aided by the computer. On the contrary, the learning is coming directly from the computer. It’s as revolutionary as the printing press. The next step is to take advantage of the new medium to teach new things. For example, there are a number of radically new programs recently developed to teach visual skills such as pursuit of a moving object—skills children are going to need to survive in this information age. All our education and psychology is printbound.”

The consensus on CAI in the classroom seems clear—it works. And the experience gained with larger machines will undoubtedly help shape effective software for the flood of personal computers entering schools, homes, and offices. Perhaps the outlook is best summed up by Kulik: “Our findings may underestimate what people can achieve with computer-aided instruction.” 

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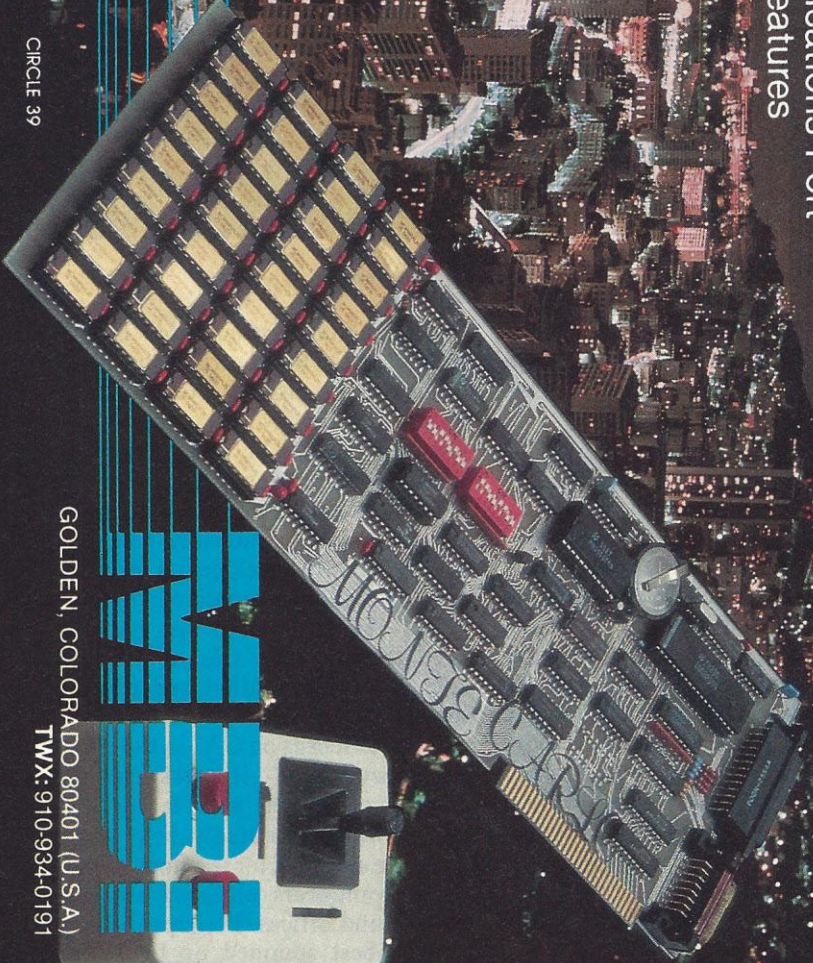
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CIRCLE 41

The Mainframe Connection

Do you really want to hook up your personal computer to a mainframe? And—more importantly—will you be able to use the data if you manage the connection?

by David Gabel, Senior Editor

The use of personal computers in a corporate environment can certainly make life easier, but contrary to popular lore, hooking into the company's mainframe computer may not be the best use of this new technology.

Here's how the pitch usually goes: When you're thinking about automating your office, try XYZ Computer. It can do . . . you fill in the blanks. And it can act as a terminal for your corporate computer, giving managers access to all the data stored on your mainframe.

Fine. The capabilities exist for such a connection. Now what?

Consider the following scenario. The CEO and the vice president for management information systems of a large corporation are talking about

office automation. The CEO says he heard personal computers could do a lot of things that might be helpful to the managers in the company. Now it's the DP manager's turn.

"I don't know," he says. "They could pose a problem. First of all, there are too many different kinds of computers. Then there's the problem of letting all those computers into the company's data. What will the auditors say? How can we safeguard the company's sensitive information?"

The company's EDP auditors are called in. They form a committee to study the problem. They promise a report in 18 months, with interim reports. In the meantime, they recommend the company publish computing guidelines stating that under no circumstances are company em-

ployees to have access to the company's data base without authority. Authority is, of course, defined by the manager of information systems.

Now that individual, if he is so inclined, is free to pursue other office-automation strategies which don't include personal computers. He can keep his computing resources to himself, with no danger of anyone but the DP staff becoming computerized.

It can happen, although nowadays many people would argue that corporations have more enlightened attitudes.

So? Suppose such enlightened attitudes exist. Suppose the company is all for disseminating computing resources. That's great, but there's still a problem.

The problem is an ingrained

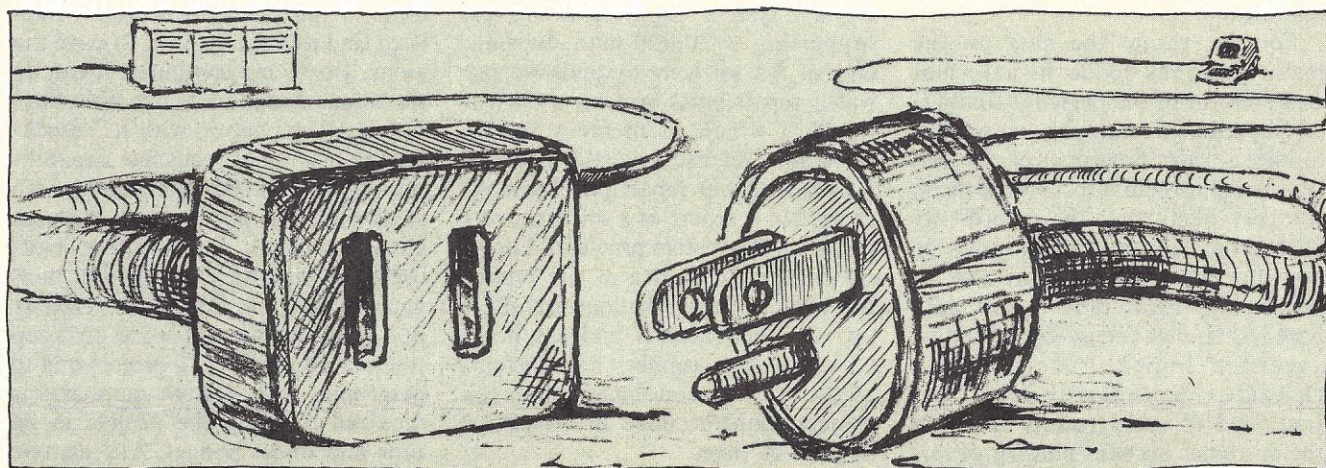


Illustration by Gilbert

attitude about computers. Any time you decide to integrate computers into the corporate structure, the corporate computer mentality comes into play. This mentality says computers represent a large investment which has to be justified, amortized, homogenized and, above all, controlled. Committees need to be formed, duplication has to be avoided, and maximum utilization has to be achieved because computers are, after all, expensive pieces of equipment. Time on computers is expensive; under no circumstances can it be wasted.

Personal computers have changed all this. Suppose the chief financial officer of a large corporation wants his own computer. In all probability, a personal computer which can do everything he needs won't cost more than \$4500. Since the IRS allows computers to be depreciated over five years, the annual cost of that computer is \$900. The chief financial officer spends more money than that in a year on lunches. Lunches are a simple expense item, not a piece of capital equipment. Does a computer these days really need to run into that kind of corporate mentality?

Even if the corporate mentality described here doesn't rear its ugly head, you'll still encounter problems if you want your computer to operate in conjunction with the corporate mainframe.

For one thing, the data on the mainframe has to be in a format that's useful to the personal computer. Suppose, for example, you wanted to look at sales records over the past year and put them into a spreadsheet. It's very likely that the records are kept in the data-processing center on magnetic tape, and read onto disk for processing. Each part of the data base has its own record design with a specified logical record length (LRECL) divided into fields. The first field of every record might be the customer account number of seven (no more, no less) digits. Other

fields could contain transaction numbers, sales amounts, etc. You might be interested only in the volume of sales, broken down by salesman, for a specific time period.

There may be a program on the mainframe which extracts that information and prints it in a report, or there may not be. Even if there is, you can't use that report generator to download the data into a spreadsheet, because the spreadsheet's data needs to be in the form of instructions the program can execute. These instructions tell the spreadsheet where to put what data and how to operate on it. Your mainframe computer will, at best, output a formatted report.

You could have your data-processing department's programmers provide a data interface, but that takes time, and besides, they've never been able to do it before, have they?

The reply from most people working in this area is no. These individuals say management's attitude toward the corporation's management-information systems department is almost one of anger. Data-processing departments have never yet been able to deliver information to corporate managers in a timely fashion, or in a format which helps the manager get his job done.

To illustrate: I used to run a data-processing shop for the Army. It was a small system, as these things go, supporting a 20,000-man division. One of the software systems we ran was a repair-parts system, a part of DLOGS which, if memory serves, stood for Defense Logistics System. At any rate, our repair-parts manager needed a report in a different format than the system provided. I don't remember the nature of the report, but I do remember that our user drew up his specifications and sat down with my programmers and systems analysts who concluded that the project could be done in a nominal amount of time.

Later—much later—the new re-

port still wasn't available, and our user was pretty steamed. Every day that he went without his report meant lost man-hours. My programmers were always tied up with some emergency or other, so they couldn't devote enough time to the project.

The same kind of situation can exist in the corporate world.

As if that weren't enough, there are the problems of hardware compatibility and data-communications protocol. You may not have, or may not be able to get, hardware and software which can communicate easily with your company's mainframe. Maybe your DP shop could put it together, but then again...

Going it alone

The conclusion seems almost inevitable. Don't worry about trying to tie your personal computer into the corporate data-processing system. The problems—institutional, psychological, hardware and software, seem insurmountable.

Besides, why should you worry about it in the first place? The fact is, there's tremendous benefit to be gained from personal computing without recourse to the company's data-processing resources. People are using personal computers in corporate environments every day without accessing all that data, and indications are that they will continue to do so. If you talk to them, you're likely to find their attitude is, "Leave me alone. I have my computer, it can do the things I need to do my job easier, so just let me get on with it." Stockbrokers use the spreadsheet capabilities of personal computers along with stock-portfolio packages to manage client accounts. Department heads use those same spreadsheets for budget preparation. Managers employ project-planning software to keep track of all phases of a project and to determine where more emphasis is required to bring the project in on time and under budget. At least one corporate vice president uses data-

Many managers are enjoying the benefits of computing without accessing mainframes.

base managers and word processors to work with his assistant in a combined effort that's better than the sum of their individual work.

Says one computing consultant we've talked to about this problem, "The point is there's a whole world of great things that can be done out there. And the personal computer is a lever to get into that world."

This consultant relates that his firm has been able to save his clients—he works with chief operating officers and chief financial officers of large corporations—thousands of dollars by putting applications on personal computers that were formerly handled either on time-sharing systems or not at all.

The reason for these savings is simple. If you want to bring up some new application on a large computer that's administered by a corporate MIS department, the first thing you have to do, usually, is request that the application be developed. Your request goes into the pool with all the other requests, and a committee analyzes them for cost savings, time savings, and the like. Budgets being what they are, many of the proposals will never be implemented. The ones that don't make it are the ones that don't promise the maximum return for dollar of DP-department investment.

Using the DP department's computers is expensive, because they truly are large pieces of capital equipment which have to be expensed, amortized, etc. Then too, programmers, systems analysts, coders, and operators all have to be paid, and that cost goes into the cost of developing the new system against which the application's cost savings are measured. Thus many systems that will benefit only one person get shelved, simply because the return isn't great enough to justify the outlay.

On the other hand, developing applications on personal computers isn't very costly at all. The hardware is inexpensive these days, and it's be-

coming more affordable all the time. Applications for personal computers can usually be developed for under \$500—you go to the computer store and buy a program that does what you want. Then the personal-computer operator, who will be the principal data operator anyway, puts in his time learning to use the application. Now that costs, but it's a personal, not a corporate cost. The manager or executive who's operating with the data would spend time with that data anyway, so the net cost to the corporation of learning the computer system is zero—provided, of course, that the data operator meets all deadlines and so forth.

After he's made the initial investment of his time, the data-operator—the manager or CEO or whoever—will have the time to not only meet his deadlines but the time to do more. One report we've heard relates that a financial officer who put in a 60-hour work week actually cut that to 30 hours per week by using his personal computer. That means this individual is now one-and-a-half financial officers, all because of his personal computer, and without using any of the company's data-processing resources.

The personal touch


The other interesting part of this phenomenon is the way in which managers seem to react to their own personal computers. In the past, a late report from the DP shop set off a lot of complaints. Not only was the data not in a usable form, but now it was too late. That meant even more work for the person involved. It was truly frustrating.

But people who have their own personal computers seem willing to tolerate failure in the operation of their applications, frustration in not getting things right the first time, and extraordinary amounts of time spent at the computer. The only explanation for this willingness to invest inordinate amounts of time and effort

in personal computing seems to be the personal nature of the computer itself. If it's my computer, I'll probably be willing to put in more time on it simply because it's mine, and because I will reap the benefits of the time investment.

If, on the other hand, you try to use personal computing in conjunction with the corporate data structure, you'll find someone else winds up putting in that time. While that's going on, and money and computer resources are being spent in the process, the person who will be the end user of the data is going nowhere. He's still using his old method of data manipulation, whatever that is. He isn't learning how the application is supposed to work. He isn't learning computing. When the computer or terminal finally winds up on his desk, he'll be able to start working on a system that he doesn't know, using rules someone else thought up. And, in all probability, the system he works on will be one that was imposed on him from above, carrying with it all the psychological baggage that imposition of technology implies.

It can be summed up like this: There are two ways to look at personal computers in the corporate environment. You can consider them as an extension of the company's mainframe computer, which means they will transport the bad of those large devices along with the good to everyone in the company who needs computing resources. Or you can think of personal computers as tools which improve the manager's or executive's ability to get his job done. The second attitude calls for a more intimate relationship with the computer, and this relationship naturally flows from letting people have their computers, and not having to worry about how that computer will interact with the rest of the company's data structure.

It's this second attitude which seems most appropriate and beneficial to managers in the information society of the early 1980s. 

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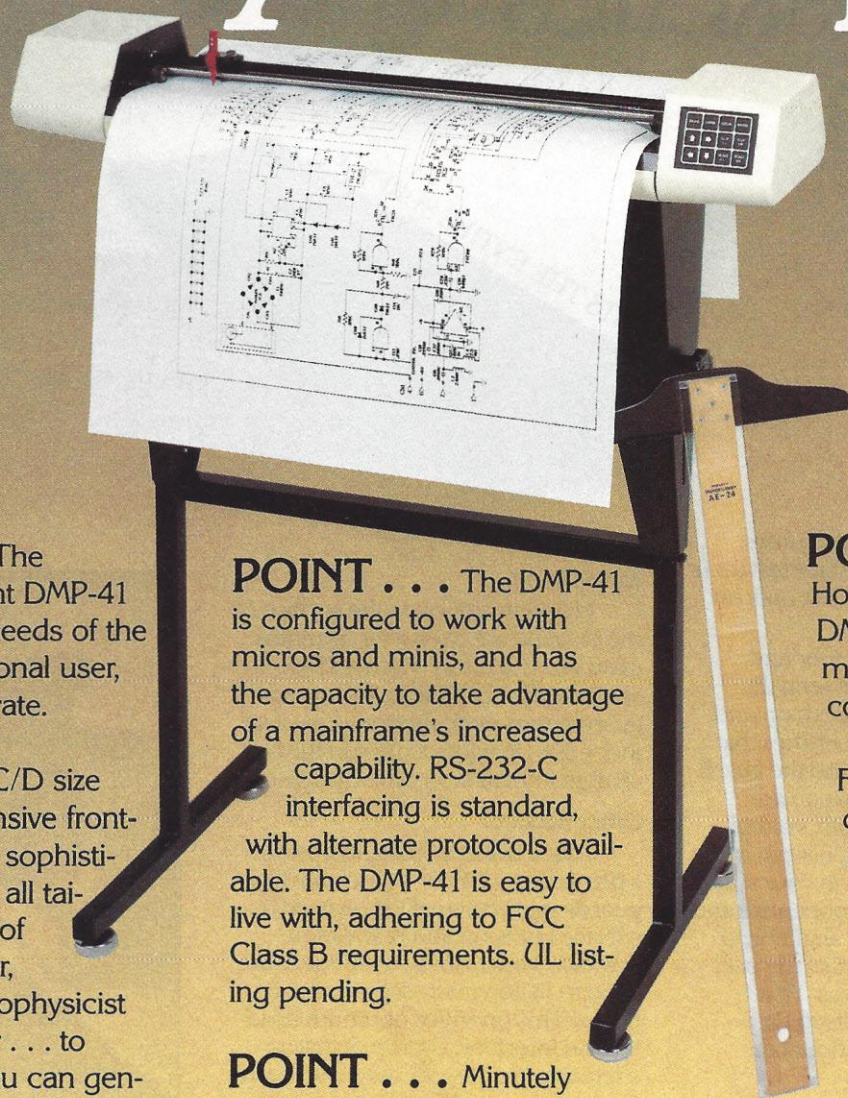
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Use Tax Law To Your Advantage When Buying A Personal Computer

Shopping for the right personal computer takes time, and June is not too early to begin planning ways to maximize your tax benefits from the purchase—whether it's for business or home. This column explores a number of the intricacies of income tax law which allow purchasers to deduct part of the cost of their new hardware and software. It also highlights some of the tax consequences of trading an older personal computer to move up to a more powerful machine.

The column was prepared in consultation with Richard L. Bernacchi and Joel Rabinovitz, partners in the Los Angeles law firm of Irell and Manella. Bernacchi specializes in the legal, business, and tax problems of the data-processing industry. He is a director and past president of the Computer Law Association, and co-author of *Data Processing Contracts and the Law* (Little, Brown & Co., 1974). Rabinovitz's background includes two years as deputy international tax counsel in the U.S. Department of the Treasury and 11 years as professor of law at the University of California at Los Angeles.

According to the Internal Revenue Code, there are two broad categories of activities that allow certain tax benefits to buyers of personal computers. First, if you buy a personal computer to use "in connection with, or in carrying on a trade or business," you can take advantage of certain tax benefits generally available to businesses: investment tax credits, general business deductions, depreciation, and the like. Second, if you buy a personal computer as "an ordinary and necessary expense" to assist you in preparing your tax returns, in

managing a series of investments, or maintaining records of properties held for income, you are also entitled to similar tax benefits. This second category can be important if you intend to use your personal computer at home not for carrying on a trade or business.

Types of tax benefits

The tax benefits generally available are of three basic types. First, there are depreciation deductions that can be taken over the life of the hardware; second, there are tax credits; and third, there are expenses which can be deducted in the year you buy the machine. In some cases your purchase may qualify for more than one of these tax benefits.

The basic scheme for depreciation, established by an amendment to the Internal Revenue Code now referred to as Economic Recovery Tax Act of 1981 (ERTA), is the Accelerated Cost Recovery System (ACRS). ACRS basically allows the cost of the property—that is, the computer hardware itself—to be depreciated (deducted) over a predetermined recovery period. Most business property would qualify for a recovery period of either three or five years. (ACRS is different from the previous law, which based depreciation on the equipment's actual useful life.) Generally speaking, the five-year recovery period would apply to personal computers; an exception would be if the personal computer were used in connection with research and development activities, in which case the three-year period would apply.

It's important to note that you get the first year's depreciation if you place the computer into service *any* time during the year, including De-

cember 31. From a tax-planning standpoint, then, if you're thinking of acquiring a personal computer in the next year, you should seriously consider buying it by December rather than waiting until January or later.

The investment tax credit is a benefit available to you if you buy a personal computer either in connection with a trade or business or to help manage your financial investments. The actual amount of the tax credit depends on whether the ACRS recovery period appropriate for depreciating your personal computer is three years or five years. For a personal computer considered to have a useful life of five years under ACRS, you can get a one-time investment tax credit of 10 percent of the total cost of the machine in the year you buy it. (If the personal computer is considered to have a useful life of three years, the investment tax credit is only 6 percent the year you buy it.) Again, as with depreciation, you get the credit for the whole year in which you put the machine into service, regardless of how late during the year you actually bought the computer. In calculating your ACRS depreciation deduction, however, you must reduce the cost of the computer by half the amount of your investment tax credit.

The Research and Development Credit, introduced by the Economic Recovery Tax Act, is completely separate from the investment tax credit. The R&D tax credit applies only to personal computers bought for research and development undertaken in carrying on an existing trade or business—not research and development needed to create a new trade or business. This standard is somewhat more restrictive than the rules for the investment tax credit, and

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that's an important distinction to tax lawyers. The R&D credit itself is 25 percent of the increase in your research and development expenditures over what you spent in a base period—usually an average of the last three years.

The basic difference between depreciation deductions and the two tax credits is the way in which the tax is calculated. Each year's depreciation is deducted from whatever your gross income might be; the net amount is then taxed at whatever your tax rate is. Thus, depreciation is useful for reducing your net taxable income; your actual tax savings are determined by your tax bracket. The investment tax credit, however, is a direct credit against whatever absolute amount of tax might be due. Depending on your income, the tax credit can produce a much greater benefit. You should talk to your accountant to find the best ways of combining the tax credits and depreciation for your specific case.

If you buy a personal computer to use in your business (but not for managing investments), you have a faster method of depreciating its cost over a period of years: You can choose to deduct the full cost of the personal computer (up to \$5000 for 1983) from your income as a business expense. This expensing election can be fairly important to purchasers in a high income-tax bracket. The amount you may deduct all at once goes up in future years—to \$7500 in 1984 and 1985, and to \$10,000 in 1986. If you decide to take this expensing election, however, you lose the investment tax credit. So you'll have to analyze your own situation to determine which tax option is most favorable.

Software tax benefits

So far we've discussed all the tax benefits with respect to hardware. When it comes to software, the government takes the position that it's not really tangible property in the

sense that was intended by the tax law. Therefore, software does *not* normally qualify for the investment tax credit.

Until recently the IRS permitted the costs of developing software to be deducted as incurred or amortized over a period of five years, and software purchase costs to be amortized over a period of time. A recent proposal in the IRS regarding the R&D credit, however, casts doubt on whether this method of recovering costs will continue to be available. The IRS has taken the position that you qualify for the R&D credit only when there is serious doubt about the operational feasibility of the software you are developing. This proposal has raised quite a controversy in the computer field because of its counterproductive nature: If the purpose of the R&D credit is to encourage people to develop new and useful things, you want to encourage them to spend money on things that are new but that they think they can accomplish. ADAPSO (Association of Data Processing Service Organizations, Inc.) is probably going to lobby heavily against the proposal. At any rate, what's important to anyone buying a personal computer for software development is that the credit applies only to new or significantly improved software as opposed to adaptations or modifications of existing programs. Therefore, what you might spend to make enhancements to your software wouldn't qualify. And if the IRS position is maintained, you'd have to prove that the result of your research and development is in serious doubt.

There are cases, however, in which the software can provide a tax benefit, even under the government's theory. If the cost of the software is not itemized separately from the hardware when you buy your personal computer—as is the case, for example, with the WordStar and SuperCalc software that comes with the Osborne 1—then the software takes on the same useful life as the hardware

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and is depreciated in the same way.

There may be another circumstance in which you can derive a tax benefit from software you buy separately. Educational expenses that are ordinary and necessary in connection with running your business often qualify as a tax deduction. If, say, you need to learn accounting techniques to carry on your business and you buy an accounting tutorial software package, you may be able to deduct the cost of the package as a business-related expense.

The federal tax treatment of software as intangible property brings up an interesting point which causes a continuing debate in the industry. In most states you are charged sales tax only on tangible property. Yet in many states you are charged sales tax on software. There are a lot of people who take the position that software should not be subject to state sales tax, citing the position of the IRS that software is not tangible property. But federal income tax and state sales tax are two different taxing schemes. And the federal government has never considered itself bound by what the states do in the sales tax area.

Now, California has recently passed legislation, based on some significant lobbying efforts by the computer industry, which may be influential in spurring changes in sales tax laws in other states as well. For many years the California State Board of Equalization had taken the position that both prepackaged and custom programs were subject to the sales tax. After much controversy and litigation, legislation was passed excluding custom software from sales tax.

Disposing of your computer

So far we've concentrated on the tax benefits to be derived from buying a personal computer. The way the tax laws are structured, however, there could be tax *liability* involved in disposing of the machine—say, if you want to trade up to a more powerful

personal computer, or if you want to donate it to your favorite charity.

Certain types of deductions will generate what is known as a "recapture" when you dispose of the property. For example, if you take a depreciation deduction over several years for your personal computer and then subsequently sell it at more than its depreciated book value, you have to treat some or all of the deductions you took in earlier years as income for the year in which you sold the machine. Moreover, if you sell the computer before the full ERTA recovery period of five years has elapsed, a portion of the investment tax credit will also be recaptured. In the computer field, where technology is changing so fast that it is very likely you'll want to trade up to a more powerful system in two or three years, how can you avoid these hefty tax penalties?

If your intention in getting rid of the machine is to buy a more powerful personal computer, you will, in general, be much better off trading in your old computer for credit on a new one than selling the old one and reinvesting the proceeds in a new one. A trade-in is what tax law calls a non-recognition transaction, which means you don't have to recognize any gain from the trade-in for tax purposes at that time (although you must recapture a portion of the investment tax credit). Even the trade-in has tax disadvantages: While you may be able to avoid paying tax on your prior deductions, you're going to pay a price in terms of what you can deduct in depreciation or in the investment tax credit with respect to the new computer. However, as a general rule, it's much better to defer tax into the future than to pay it now.

Here's an example (ignoring tax credits for simplicity): You purchased a personal computer in October 1982 for \$3000 and plan to move up to a newer model for \$5000 in January 1984. Under the statutory percentages of ACRS, you would

GEMS OF WISDOM

A Case Of Translation Problems

In my experience, people who own personal computers like to translate programs to run on different machines. When switching from an Apple II to a TRS-80, for example, the Apple command `X MOD Y` poses a problem. This used to frustrate me until I found a way to sidestep the difficulty. I took `X` and `Y` and put them into an array of function commands, and came up with this equation:

`INT(X-Y*INT(X/Y))`

This is a sufficient substitution for the Apple command.

Don C. Jacobs
ENGLESDALE, TX

This Gem of Wisdom wins \$25 for Don Jacobs. If you have an anecdote, a tip, a secret to share, send it (up to 250 words) to Gems of Wisdom Editor, Personal Computing, 50 Essex St., Rochelle Park, NJ 07662. If we can use it we'll pay you, too. Best of all, you'll be helping someone else with his personal computing.

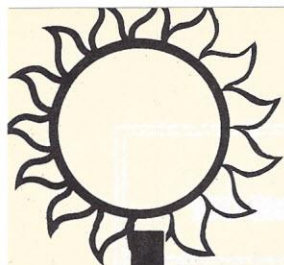
Must I Hit Return Every Time?

When I use WordStar to print documents, I generally use the default values for the printing questions that appear after the `ctrl. P ^ (ΔP)`. Rather than hitting RETURN for each and every one of these, you can do the following in response to the question, "What file to print?"

If you respond with the file name and the ESCAPE key, the printing will start immediately and you're spared the nuisance of hitting RETURN for the remaining questions.

Terry A. Ward
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If you wish to donate the equipment to a charitable institution, you would qualify for the normal charitable deduction following the same rules as for any other item you might donate: You would be entitled to a deduction equal to the fair market value of the item, so long as it does not exceed the depreciated cost of the equipment. Thus, if you've already taken a depreciation deduction for the donated computer, you will have to subtract the amount of the deductions you've taken from the original cost of the equipment to determine the limit of your charitable deduction.

Rule of thumb

There are substantial tax benefits to be gained from buying a personal computer if you plan carefully. However, if you're buying with an eye to moving up in a couple of years, you will want to closely examine the tax consequences of various courses of action so you don't suffer later from the tax benefits you take now.

If you have legal questions regarding personal computing and the law that you would like to see discussed in future columns, address them to: Trudy E. Bell, Associate Editor Personal Computing

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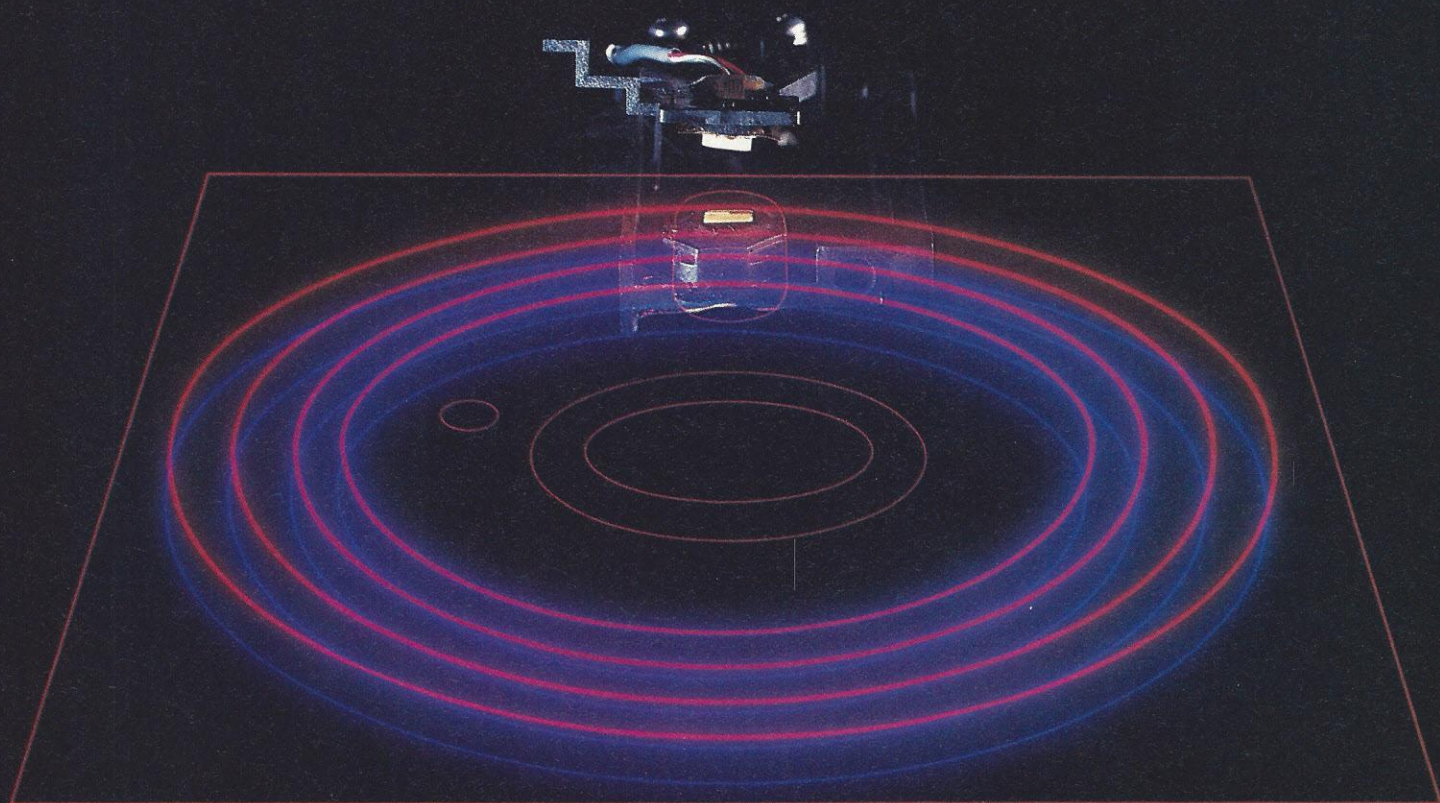
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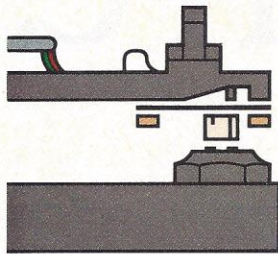
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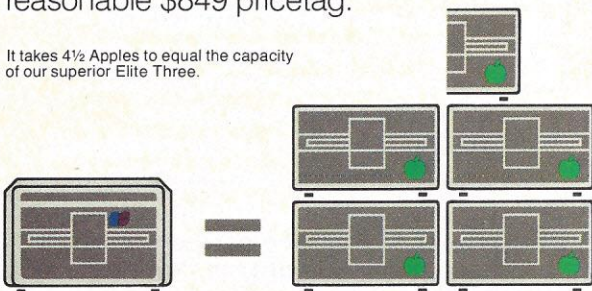
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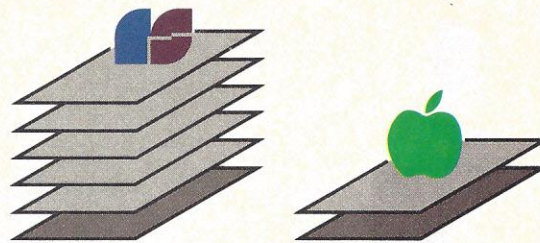
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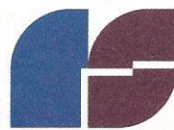


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BOOK REVIEWS

Will Computers Become A New Species?

MICRO MAN: COMPUTERS AND THE EVOLUTION OF CONSCIOUSNESS

DR. GORDON PASK WITH
SUSAN CURRAN
MACMILLAN PUBLISHING CO., INC.
NEW YORK, NY
221 pp., \$14.75 hardbound

Look! Up in the sky! It's a bird . . . it's a plane . . . it's Micro Man!

Sure, you can smile, or even laugh. But wait until you read *Micro Man*. You'll be laughing out the other side of your disk drives. How about this, from the book's introduction: "Computers are no longer merely our tools. They are a species in their own right, neither independent from us, nor subservient to us What kind of relationship will exist between the two populations, human and computer? . . . We could go even further, and speak not of two species . . . but of one species, mind, which may reside in one or many people, or machines, or constructs as yet unimagined."

Contrary to what you might expect, the authors are not a pair of gurus from the Church of Large-Scale Integration. Dr. Gordon Pask's list of professional credits is as long as a book jacket flap, and includes a few professorships in cybernetics. Susan Curran is a director with a British consulting firm and writes for several technical journals.

In all fairness, it should be noted that where the ellipses appear in the above quotation are all sorts of reassurances by the authors that it will all work out, as long as we watch our step. But that business about computers being a species leaps from the page and stays in the mind all through the book.

Perhaps the most unfortunate aspect of this book is that were it not for the notion that computers have evolved into a species, there's an elegant and eminently readable philosophical-cum-historical development here. It opens with the usual (and by now soporific) evolution of counting machines, beginning with the abacus, and shows how more and more the machines' computational processes emulate the mind's thinking processes.

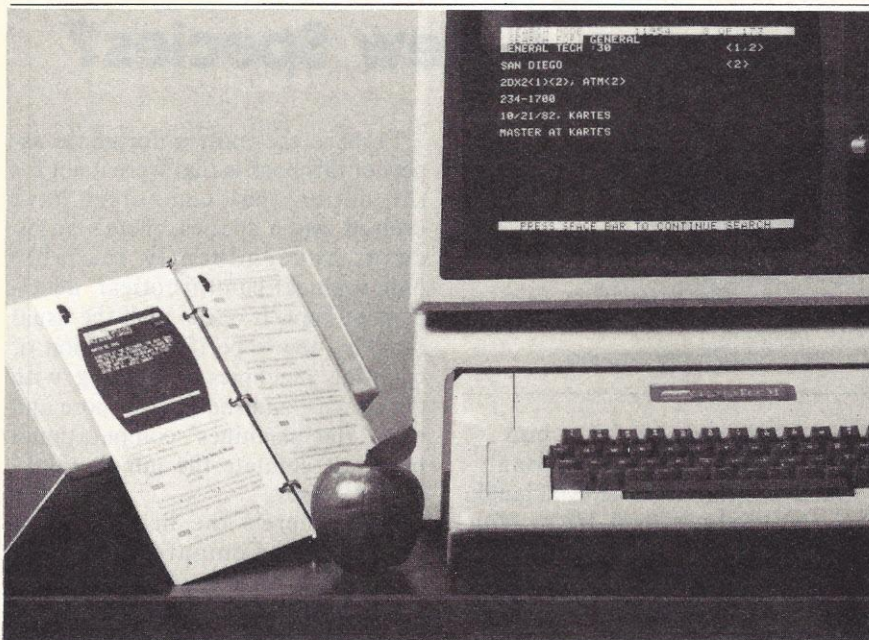
Then there's the matter of reproduction. Computers are now being used to manufacture other computers. For example, at least theoretically, some of a computer's ROM could be intermingled with another computer's ROM. This intermingled ROM would reside in a third computer which somewhat resembles the first two but is exactly like neither of them—which sounds uncomfortably like what happens with genes and chromosomes. And once a programmer sets the process in motion, it could be carried on without human intervention, so that whole generations of computers with random, unpredictable capabilities could be produced. Eureka! A species!

That, basically, is Pask's philosophical premise. (Although "we" is used throughout, one suspects that the ideas are mostly the professor's and the writing mostly the consultant's.) The question left unanswered is: Why would anyone, except some nut with a Frankenstein complex, want to do such a thing to begin with? Be that as it may, when computers become and behave like that, we will all become—you guessed it—micro men: "Can we hold a real conversation with a computer if it has been programmed to ask and answer

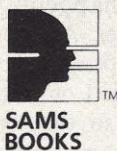
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AD358

BOOK REVIEWS

questions in ways we cannot predict? Would we merely be talking to the ghost of the programmer, or to ourselves? If neither, we would surely be talking to the computer itself. We would undoubtedly find our thoughts influenced by our interaction with the computer. At that moment we would become micro men."

—Marvin Grosswirth

Evaluating word processors

WORD PROCESSING BUYER'S GUIDE

ARTHUR NAIMAN
MCGRAW-HILL, INC.
NEW YORK, NY
325 pp., \$15.95

Any time someone sits down to evaluate word-processing products, he is faced with an enormous task. He is also faced with the reality that a complete review is beyond the capabilities of a single person. Although Arthur Naiman acknowledges this fact, his book is still a standout.

Most software reviews—word-processing reviews in particular—degenerate at some point to a statement of opinion. For example, "I found the cursor-control features of product X very easy." Or, "Feature W on product X isn't as convenient as it is on product Y." From my experience, this is the writer's final refuge.

Naiman takes a different tack. He sets up a 100-point scale for his evaluation of word processors, and tells you why each of the points is awarded, or, in some cases, deducted. Of course, Naiman's scale is subjective, as any such rating scheme must be. But you at least know the subjective reasoning for the scale, and you can modify it.

Naiman uses his scale to evaluate word-processing products sent to him

from publishers. He sent requests to as many software publishers and manufacturers of dedicated word processors as he could find. Unfortunately, few responded in a useful way. He tells you which ones did and which didn't. Chapter five of the *Word Processor Buyer's Guide* contains a discussion of the rating factors, and chapter six gives detailed explanations of why each of the 14 rated products got the score it did. Comparison charts in chapter five list how each of the products did in each of the categories Naiman evaluated.

Longtime computer users will be surprised at Naiman's results. He says the "major" word-processing programs he evaluated wound up seventh, ninth, 10th, 12th, 13th, and 14th. Naiman summarizes the unexpected results of his comparisons by saying, "Two things strike me about these scores. The first is the exceptional showing of PIE Writer—third from the bottom in price and third from the top in performance. The second is the fact that, although dedicated word processors tended to do better than microcomputer programs...there was a lot of overlap. PIE Writer beat four out of six dedicated word processors, WRITE beat two and tied a third, and WordStar and NewScript beat both Wangs."

You may be tempted to skim the first few chapters and proceed directly to these comparisons—but do so with caution. Computer or word-processing neophytes should start at chapter one because the author explains his terminology as it appears. Experienced computer users, however, can skip ahead to chapter four, which tells what to look for when selecting a word processor.

So whether you're a novice or a hacker, you'll find this book informative and fun. Naiman's style is conversational, yet clear and succinct. The book covers the word-processor field better than most works of this type, which is praise enough.

—David Gabel, Senior Editor

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As applications expand and hardware costs decrease, many personal-computer owners are doubling their computing power with a second machine. See what a second computer can give you in the July cover story of *Personal Computing*.

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Scott Fresener
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Tempe, Arizona

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BOOK REVIEWS

Electronic wordsmithing

WRITING IN THE COMPUTER AGE

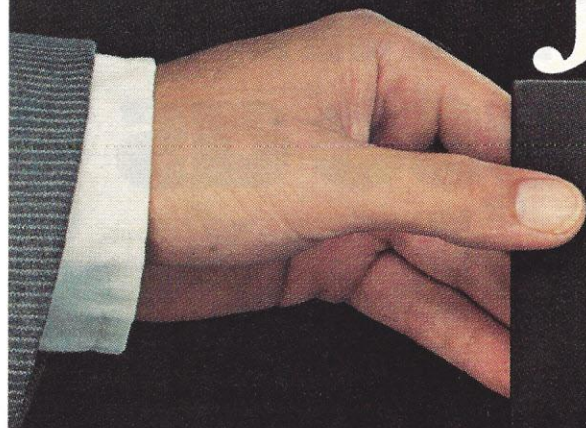
ANDREW FLUEGELMAN AND
JEREMY JOAN HEWES
ANCHOR PRESS/DOUBLEDAY & CO.
GARDEN CITY, NY
254 pp., \$10.95

As the title indicates, this is a book about writing using one of the most important developments of the 20th century—the computer. In particular, the authors show how to use word-processing techniques to improve the mechanics of writing. I choose the word "mechanics" because neither the most sophisticated word processor nor this excellent book will, as the book cover boasts, "...change dramatically the craft of writing." The combination of a good word-processing program and a personal computer can aid an author considerably, but the craft of writing remains within the writer.

Although I regard writing as a craft, it is not a mystical talent of a privileged few. As Laurence Sterne, the author of *Tristram Shandy* said, "Writing, when properly managed, is but a different name for conversation." Like many crafts, writing is a skill that can be taught and learned by many. There are individuals with exceptional writing talents, but, almost without exception, those writers have honed their skills over the years with hard work. Writing is a craft that requires experience and frequent practice to keep the skills sharp. A word processor can be a tremendous help for putting thoughts into written form and practicing the craft of writing.

If you write at all, either professionally or as a casual correspondent, *Writing in the Computer Age* will be useful to you. The authors do not describe how to buy a personal computer
(continued on page 155)

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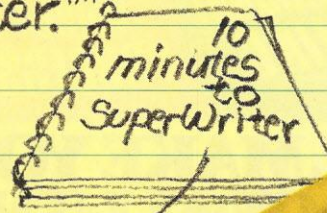
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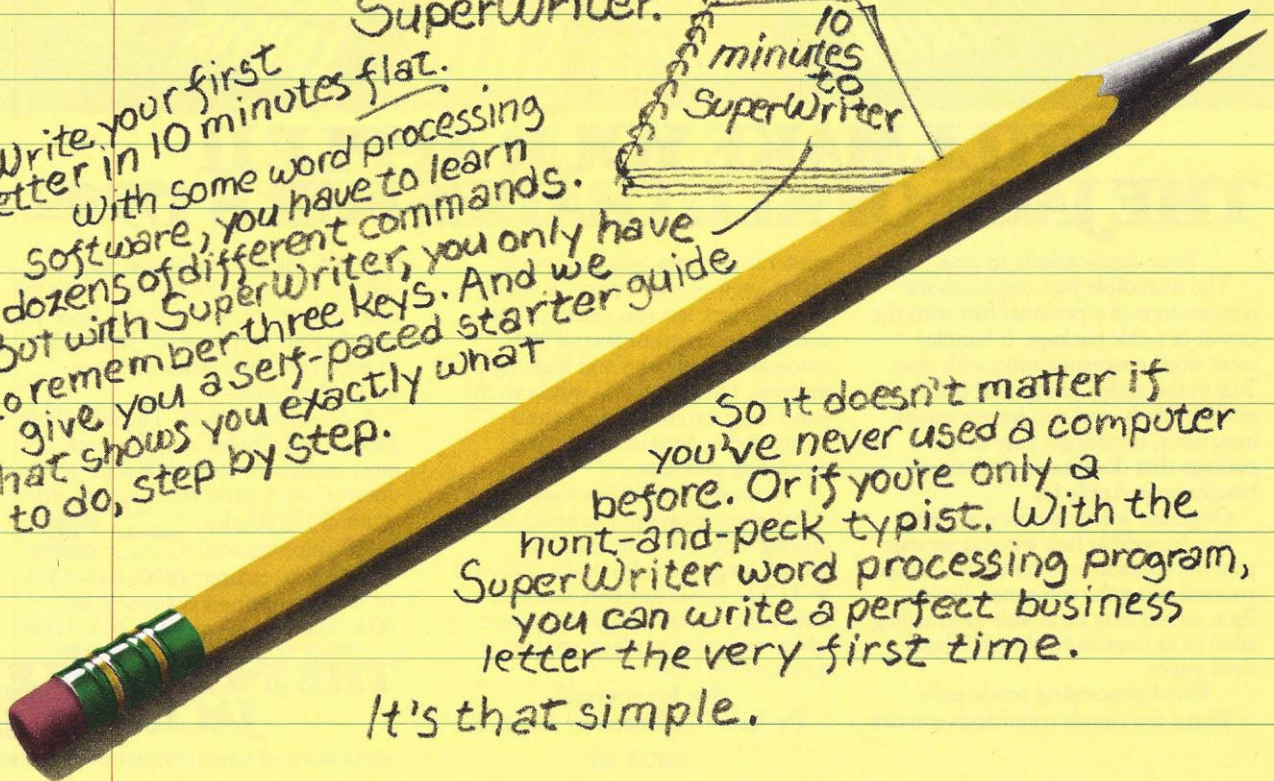
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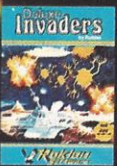
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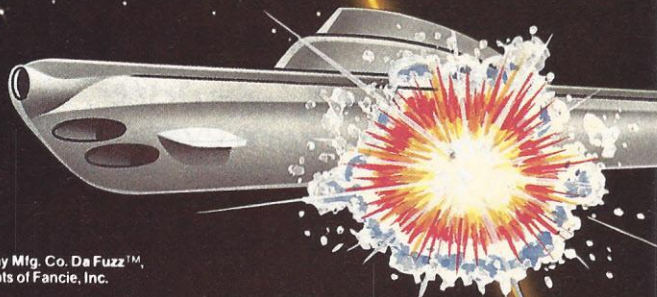
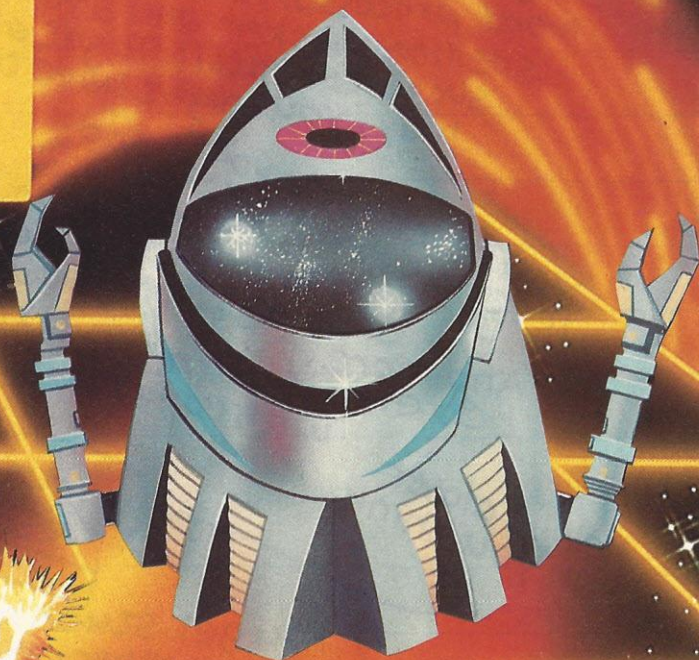


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BOOK REVIEWS

(continued from page 150)

er, nor do they recommend specific word-processing software. Instead, they show how to get the most from word processing, a rather different exercise than writing with a typewriter. If I had read this book before I began to use a word processor, I would have bought totally different hardware and software and saved myself much aggravation.

The authors are both experienced writers. Andrew Fluegelman is the owner of Headlands Press, a California book packager, and Jeremy Joan Hewes has written five books. Both authors write frequently for a personal-computer magazine, and both are conversant with software. In fact, Fluegelman is the author of PC-TALK, a widely used communications package for the IBM Personal Computer.

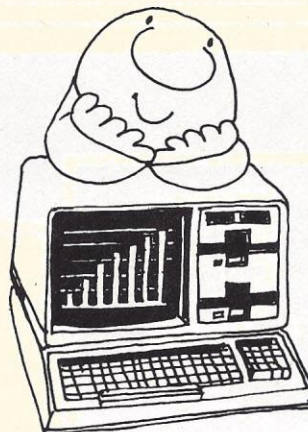
The book is divided into two parts—skills and style. The skills section deals with the hardware and software needed for efficient word processing, the basics of writing and editing on a screen, formatting for printing, the housekeeping of electronic files, system maintenance, and so on. I found myself nodding in agreement as I read the hints and advice given in these chapters. If you have absolutely no experience with word processors, some chapters may be a little daunting, but they're worth reading and digesting before taking the plunge into electronic wordsmithing.

The second, shorter part is subtitled "Style." Here I parted company with the authors since I found these chapters to have little to do with writing style. Literary style has nothing to do with word processors or any other mechanical way of putting thoughts into print. Indeed, literary style probably cannot be developed from books. Like a painter, a writer has to search for a style.

The section is, however, well written and helpful. It gives guidelines to aid the work of writing in much the

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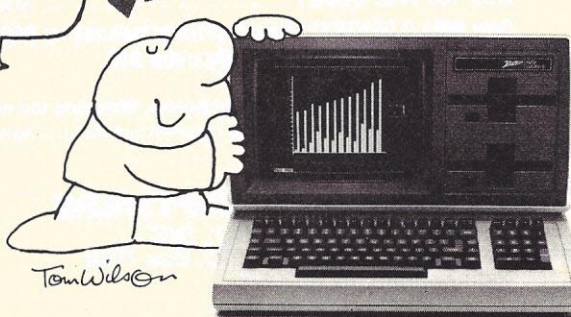
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BOOK REVIEWS

same way that *The New York Times Manual of Style and Usage* can help a writer achieve consistency and precision. In this section the authors discuss becoming comfortable with a word processor, the mechanics of editing on paper and on the screen, proofreading, producing elegant manuscripts, organizing research and files, and using computer communications.

I was a little disappointed that the authors, who have experience with a variety of word-processing software, did not attempt to review some of the better packages.

However, I don't wish to allow these comments to detract too much from this valuable book. If you have Juvenal's "inveterate and incurable itch for writing," you should definitely read *Writing in the Computer Age*.

—**Jeffrey Bairstow**

Classroom computers, part I

MICROCOMPUTERS IN EDUCATION

CHRISTOPHER SMITH, EDITOR

ELLIS NORWOOD LIMITED

CHICHESTER (U.K.)

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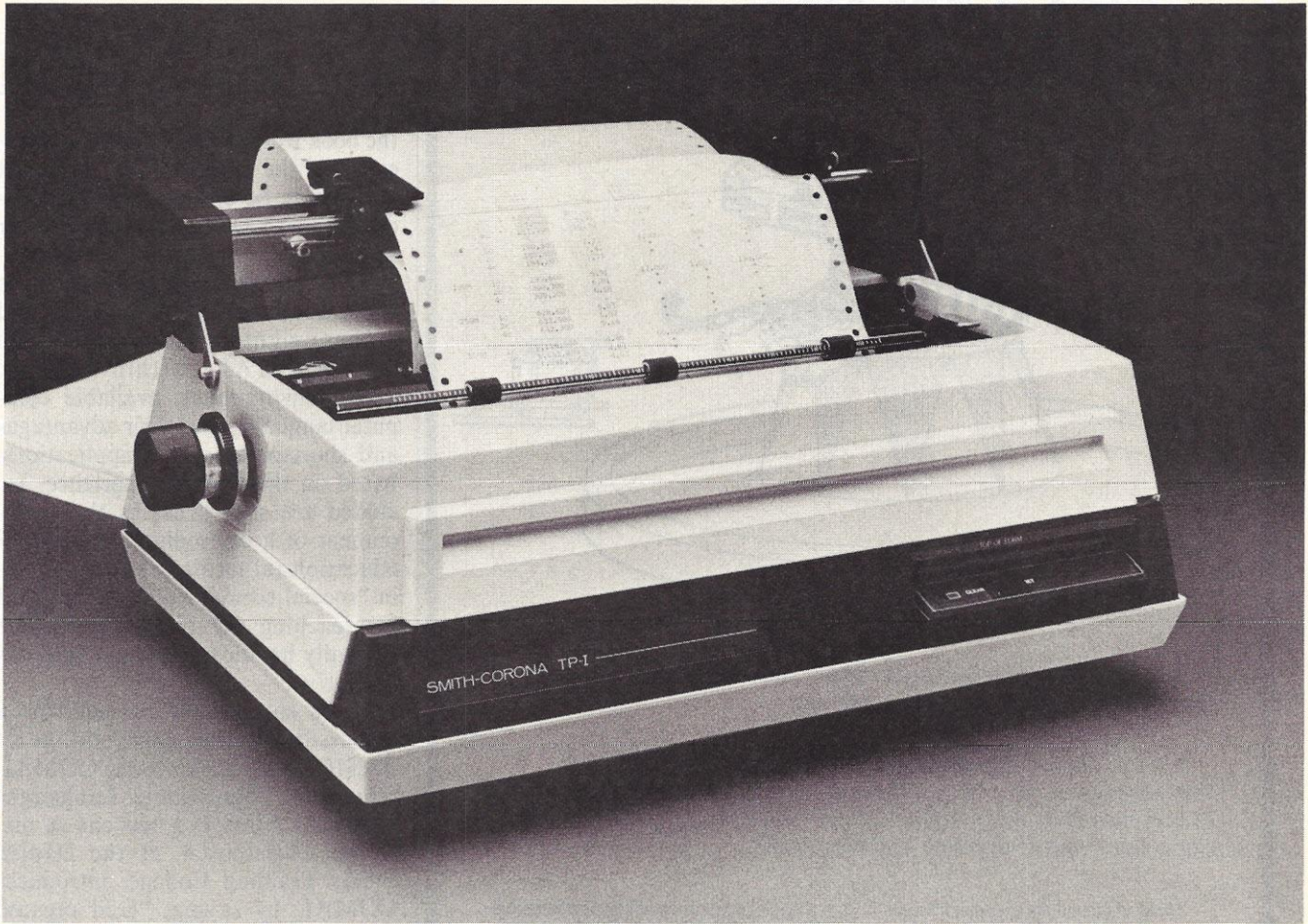
(DIV. JOHN WILEY & SONS)

NEW YORK, NY

212 pp., \$34.95 paperback

Mr. Smith is a physiologist by trade but a "micro man" by affinity; his credits describe him as "Convener of the PET Users Education Group." For this book, he has "convened" 18 experts intimately involved in the introduction of personal computers to public education. The catch here is that Smith and company are writing about British education, so the book's value to Americans is delimited by the differences in the two systems. There are, nevertheless, enough similarities to make

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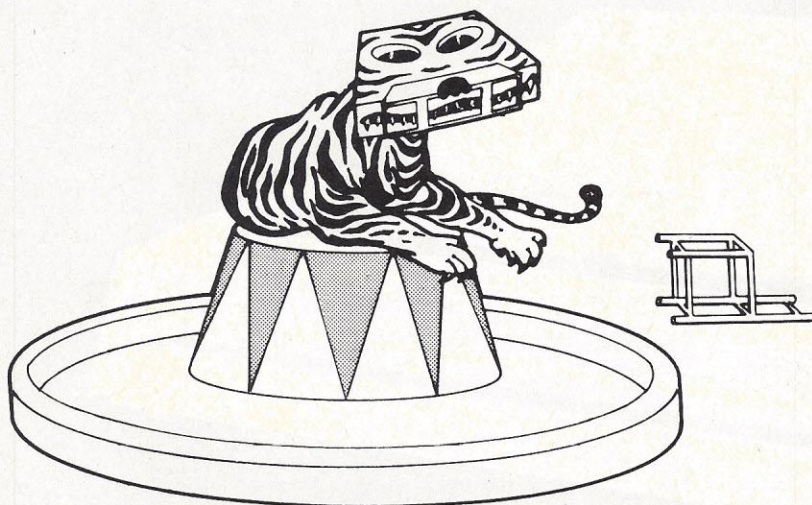
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The Fine Print: All issues from July 1981 available — ask for list. Programs are for the Extended BASIC model and occasionally for disks.



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BOOK REVIEWS

the book worthwhile for anyone interested in the subject. (That interest had better be either intense or tax-deductible; \$34.95 is a high price for any book.)

The book is sensibly divided into three sections: administrative and management of computer-aided learning (CAL) within a public school environment; available computer languages and their advantages and shortcomings; and applications, based on the British experience. Included are such areas as the development of a curriculum, the role of education authorities, the use of CAL in "special education" (Educationese for teaching the physically and/or mentally handicapped), and business education.

I was particularly intrigued by a discussion of the shortcomings of BASIC in CAL, vis-a-vis COMAL (Common Algorithmic Language) which, I confess, is a new one on me. Borge Christensen, of the Danish States Training College, introduces COMAL by saying, "God created the computer to make life easier and more diverting to man. Shortly after, the Devil invented BASIC to confuse man's mind and make it harder for him to use computers."

The Devil also invented Educationese, which consists not only of jargon—terms like "ESN(M) children" are liberally sprinkled throughout the book, with no explanation of what they mean—but of a style of writing that often suggests that the occupation of space on the page is more important than what is being said. For example: "The activities carried out in a classroom in a secondary school during school hours are the focus of curriculum innovation efforts. These activities are tightly constrained by time slots or periods, signaled by bells. The active units in the system are the teacher and the pupils in the class group . . ."

If any of you active units out there
(continued on page 163)

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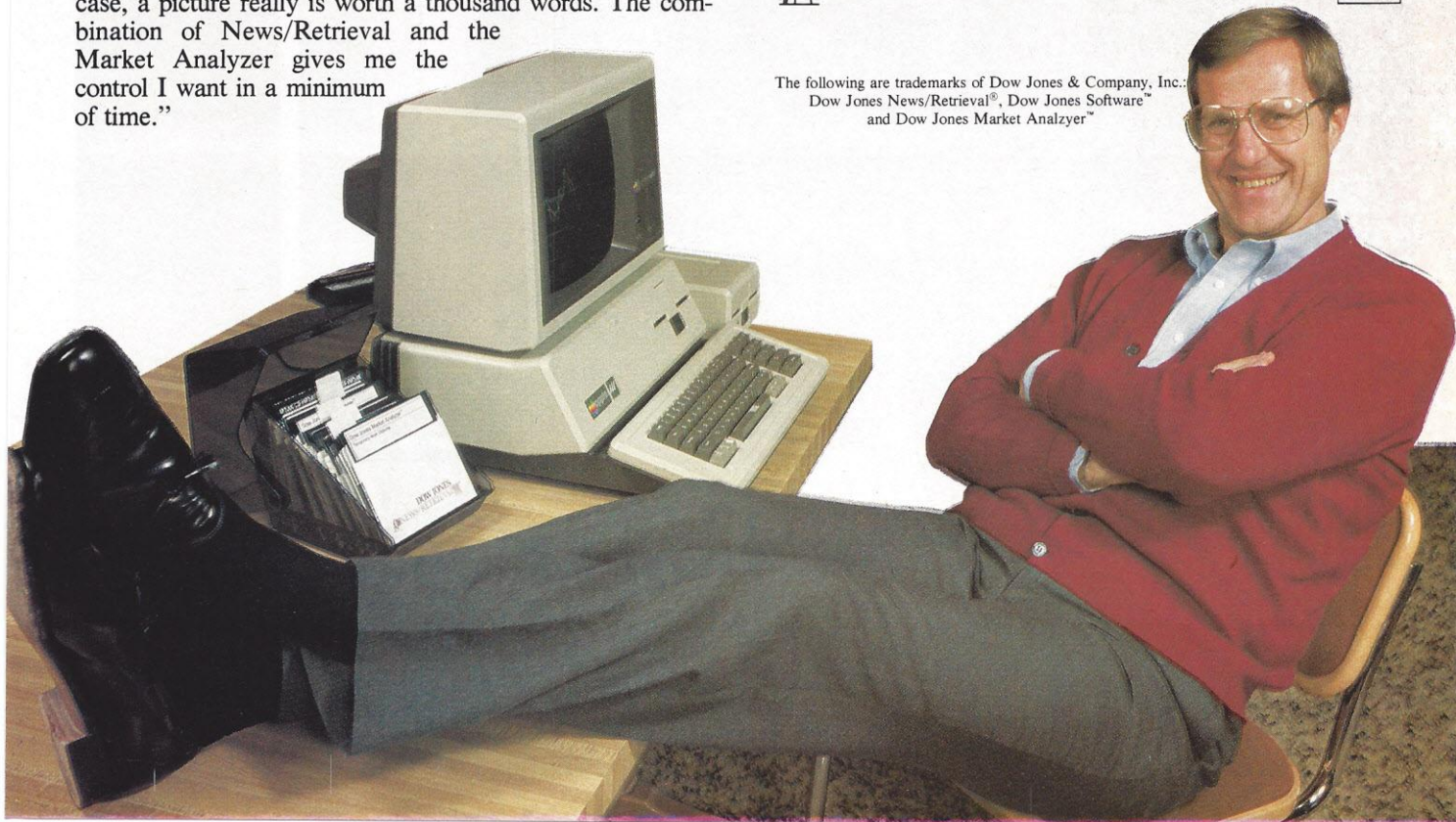
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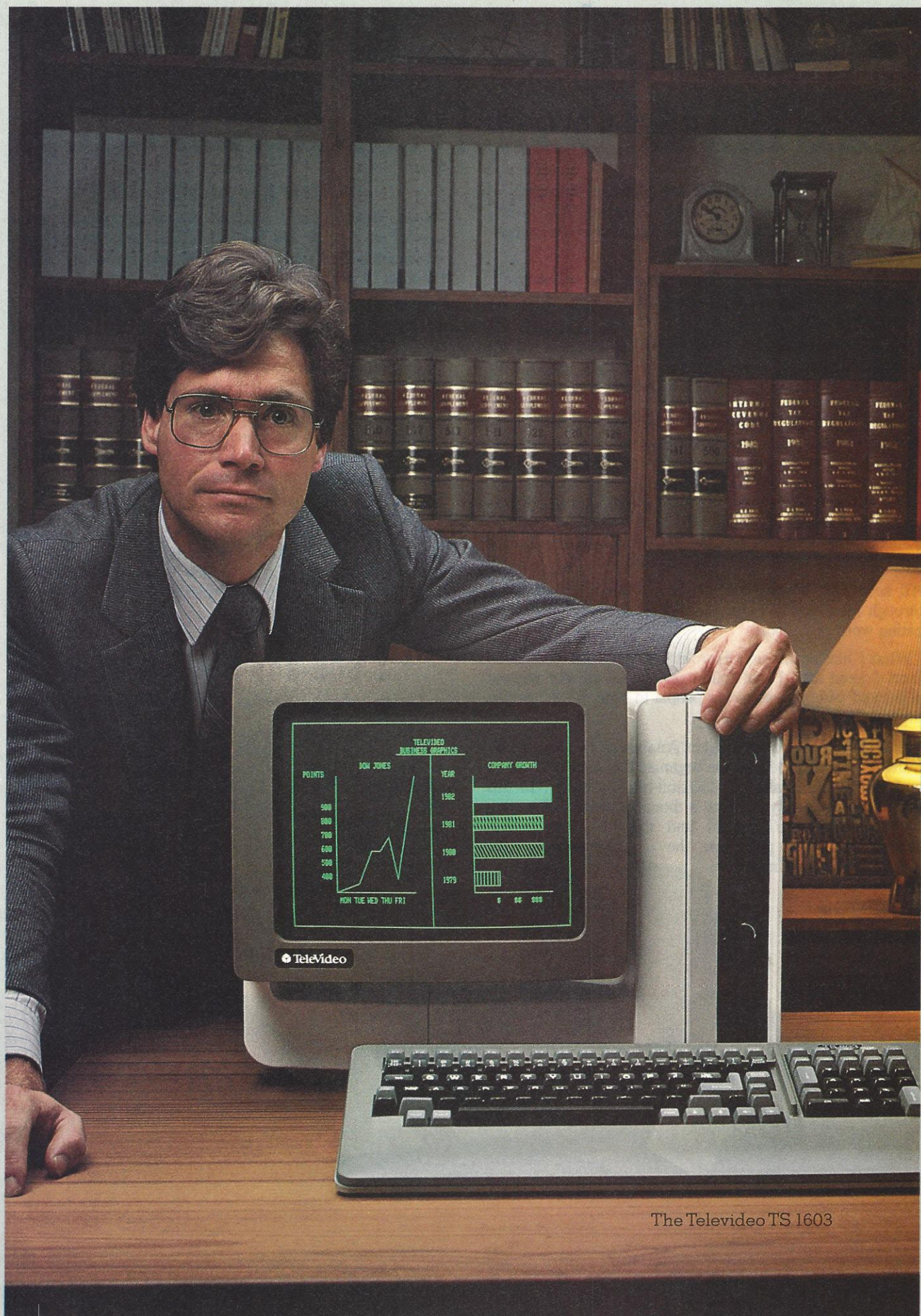
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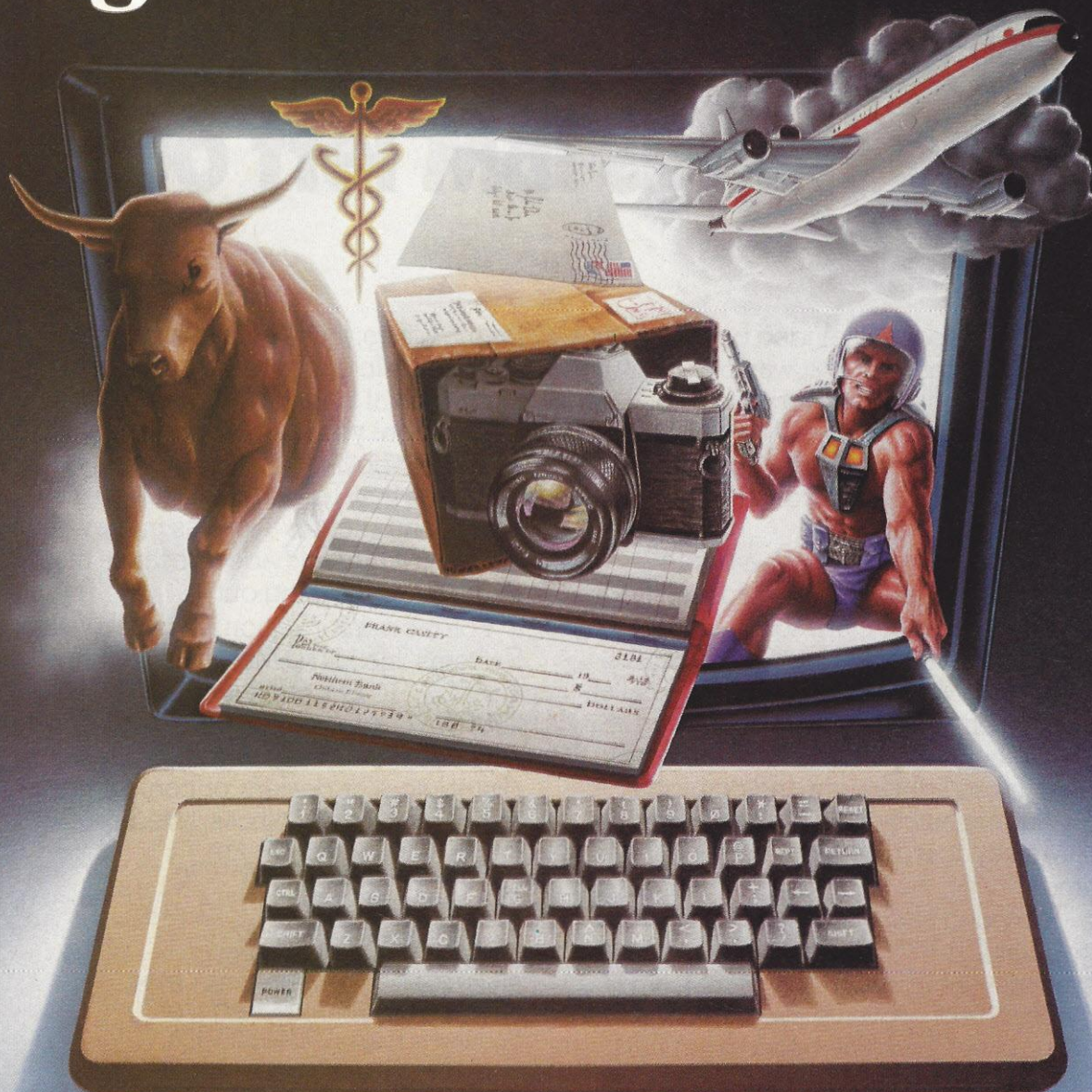
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BOOK REVIEWS

(continued from page 158)

are prepared to endure that kind of talk, can afford the price of the book, and have a need or desire for a careful and well-laid-out analysis of CAL in theory and in practice, *Microcomputers in Education* could prove an excellent source of information and some practical ideas.

—Marvin Grosswirth

Classroom computers, part II

THE ELEMENTS OF CAL: THE HOW-TO BOOK ON COMPUTER AIDED LEARNING

DAVID GODFREY AND
SHARON STERLING
RESTON PUBLISHING CO., INC.
RESTON, VA
286 pp., \$16.95 paperback,
\$21.95 hardbound

The authors of *The Elements of CAL* assume that readers have a thorough knowledge of at least one computer and one programming language. Otherwise, they suggest, skim through the book to get an idea of some of the possibilities and potentials of CAL, go learn your language, and then come back and reread their book, this time more carefully.

If that seems a trifle off-putting to newcomers, it should be welcome news to experienced computer users ready to take the plunge into CAL.

Essentially, this no-nonsense, straight-talking, readable work is a handbook for IMPS—Instructional Management and Presentation System—a methodology of constructing, analyzing, and evaluating CAL projects through a system of layers. Godfrey and Sterling, who developed IMPS, take the reader through the procedures necessary to create effective courseware.

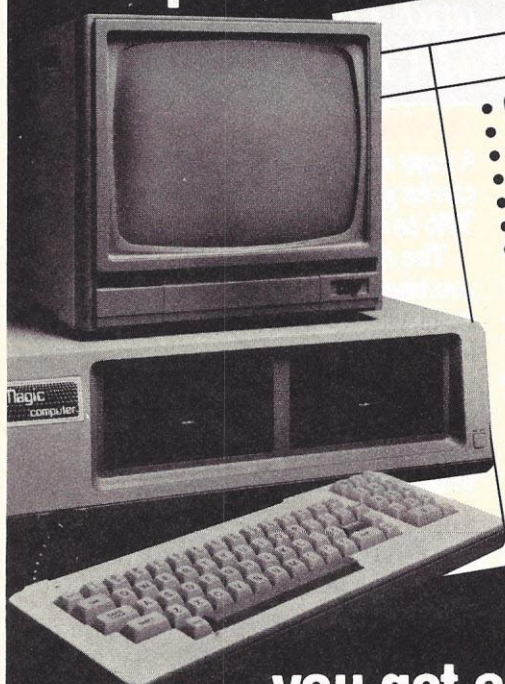
The nine layers of IMPS include the definitional layer (the most im-

COMING IN FUTURE ISSUES

Buyer's Guide To Buffers and Spoolers

Buffers and spoolers let you use your computer while you're printing. Our July buyer's guide compares these two ways of speeding up I/O bound processing and surveys the products available.

Are you paying more for your options than you are for your computer?



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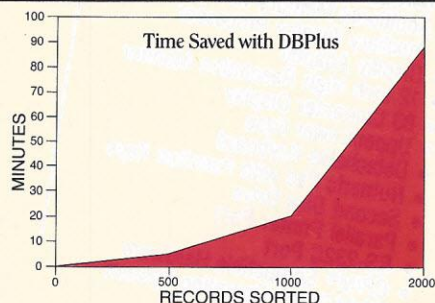
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COMING IN FUTURE ISSUES

Expanding The Computer Curriculum

When a New Hampshire school board passed a bill establishing a computer literacy requirement for its students, it took an important step forward in preparing young people for the working world. Find out how the program was implemented in the July issue of *Personal Computing*.

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BOOK REVIEWS

portant because it sets out the goals and rules by which those goals must be achieved), local structures, presentation, tracking, mapping, student support structures, author support structures, site implementation, and network implementation. Throughout each careful discussion of the meanings and applications of these layers, the authors urge the reader to "keep it simple."

Included is "Curriculum Four," which not only demonstrates the practical applications of IMPS, but consists of two courses called "Words" and "Fractions." Anyone with an Apple II Plus and Pascal can key in the programs directly from the book, which by itself makes it worth the price.

With the aid of IMPS, the reader will be able to develop and implement, on a practical basis, all sorts of courseware.

—Marvin Grosswirth

A straightforward approach to programming

BASIC FOR THE APPLE II: A SELF-TEACHING GUIDE

JERALD R. BROWN,
LEROY FINKEL, BOB ALBRECHT
JOHN WILEY & SONS, INC.
NEW YORK, NY
410 pp., \$12.95 paperback

Brown, Finkel, and Albrecht are the authors of the well-received *BASIC for Home Computers*, as well as a number of other self-teaching guides for computer users. So it should come as no surprise that this latest addition lives up to the promise of its subtitle admirably. With Applesoft BASIC, a copy of *BASIC for the Apple II*, and a few quiet hours alone with the computer, it should be possible to write one's own programs with relative ease.

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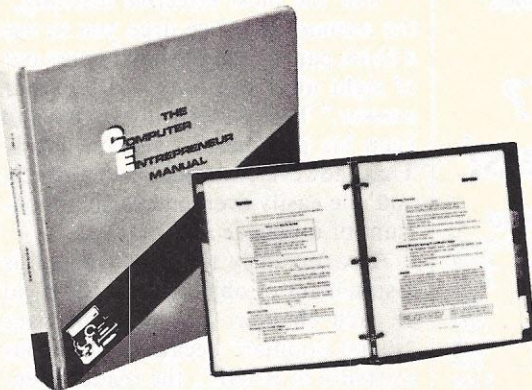
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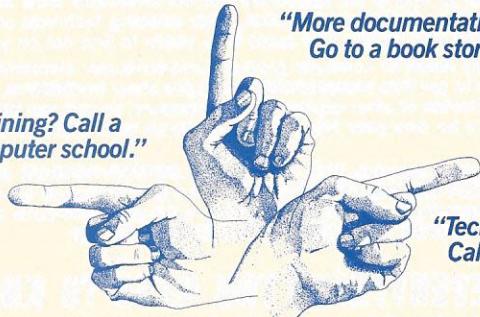
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Buyer's Guide To Computer Furniture

As technological advances bring us more sophisticated computers, furniture manufacturers are responding with ergonomically designed furniture to support and enhance the new hardware. For a full report on computer furniture, see the special buyer's guide in the September issue of *Personal Computing*.

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BOOK REVIEWS

The authors use a time-tested, effective technique—a simplified version of what used to be called "programmed instruction." The material is divided into short sections, called "frames," so that the reader doesn't have to try to absorb too much information at one time. Each frame is followed by some fill-in-the-blank questions. If the reader gets the answers wrong, he just backs up a few paragraphs and reviews the pertinent material. The answers are printed directly below the questions.

"For the most effective learning," the authors say, "we urge you to use a thick paper to keep the answers out of sight until you have written your answer." The reader will also have to keep his peripheral vision in check. That, however, is a minor drawback, and one easily overcome with a modicum of diligence and practice.

A particularly thoughtful touch is a statement of objectives at the head of each chapter. If those objectives "sound familiar" because of previous exposure to BASIC, the reader is encouraged to go directly to the self-test at the end of the chapter. If all the questions are answered correctly, that chapter can be skipped. At the back of the book is a "Final Self-Test" of considerable complexity that not only indicates how well the reader has learned the subject, but also provides practice in programming.

BASIC for the Apple II is really a book for beginners. It starts out with some elementary terms and principles, and gradually takes the reader through actual programming—from a simple number-guessing game to a program for budget management. The language is simple and straightforward. Sentences and paragraphs are short, presenting one idea at a time. But the authors are never patronizing or demeaning.

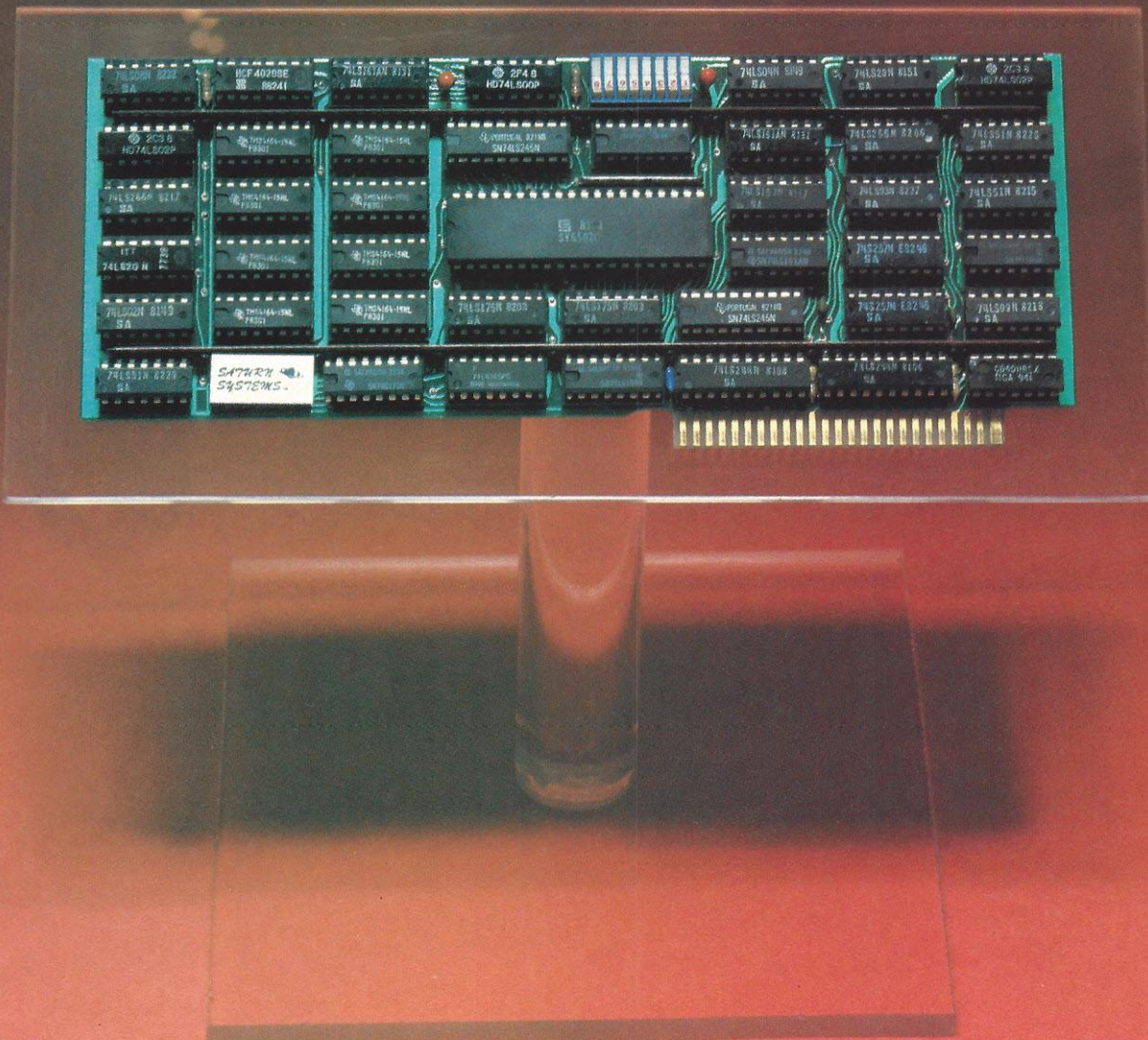
Apple II owners who have the itch to create their own software would do well to invest in this book.

—Marvin Grosswirth

(continued on page 171)

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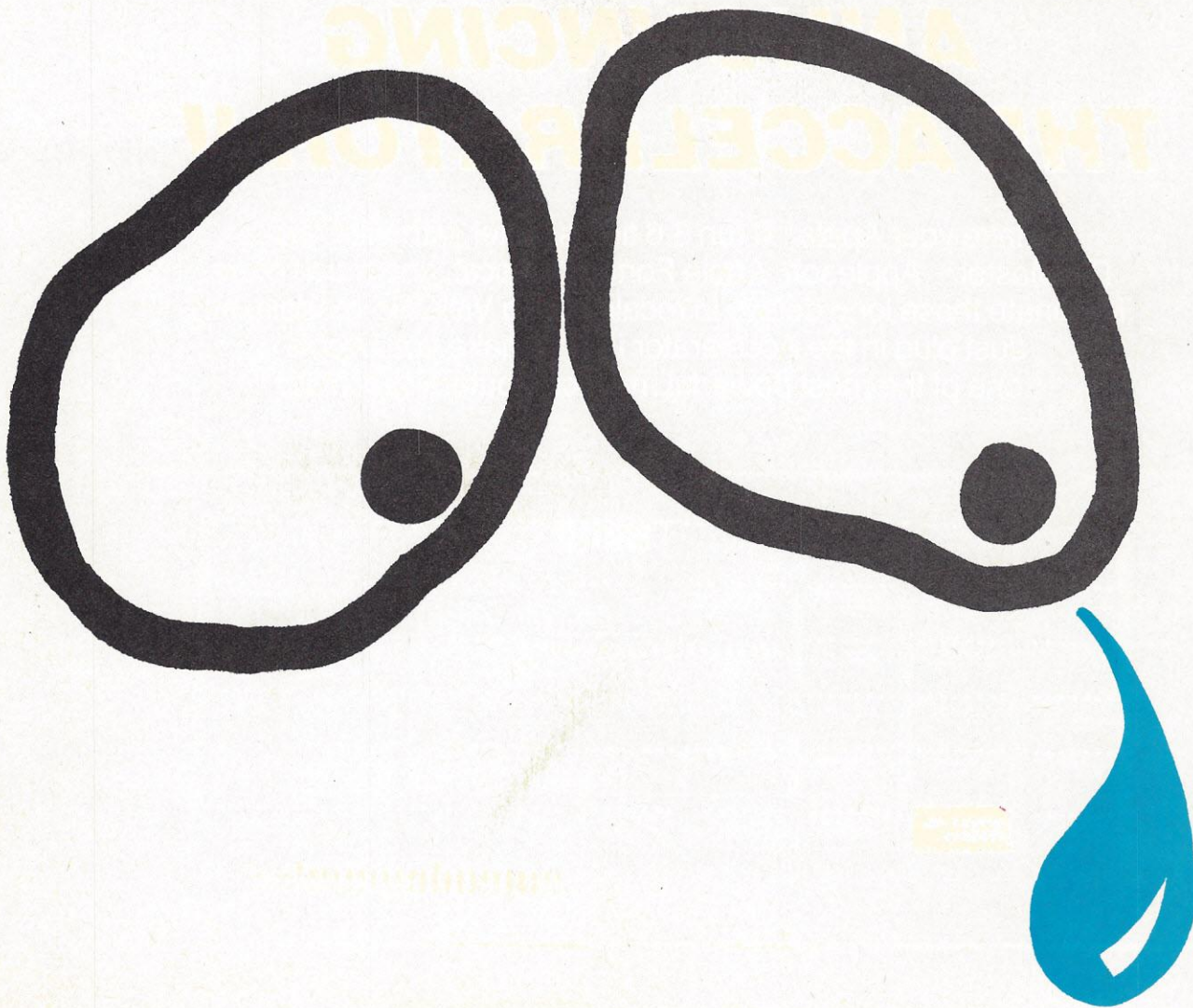


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With the EasyFamily, it's difficult to make killer errors, like erasing every name in your New York file when you just wanted to change a zip code number. For example, with EasyWriter II, if you press a wrong key, the program will give you an error message and ask you to press a specific key to continue. It's like having a built-in safety net.

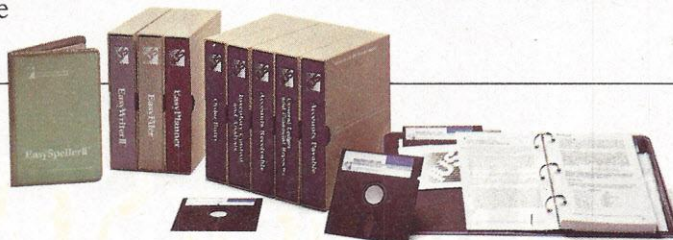
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Don't let price get in the way of owning a quality printer.

Adding a printer to your computer makes sense. But deciding which printer to add can be tricky. Do you settle for a printer with limited functions and an inexpensive price tag or buy a more versatile printer that costs more than your computer? Neither choice makes sense.

Here's a refreshing option—the new, compact STX-80 printer from Star Micronics. It's the under \$200 printer that's whisper-quiet, prints 60 cps and is ready to run with most popular personal computers.

The STX-80 has deluxe features you would

expect in higher priced models. It prints a full 80 columns of crisp, attractive characters with true descenders, foreign language characters and special symbols. It offers both finely detailed dot-addressable graphics and block graphics.

And, of course, the STX-80 comes with Star Micronics' 180 day warranty (90 days on the print element).

The STX-80 thermal printer from Star Micronics. It combines high performance with a very low price. So now, there is nothing in the way of owning a quality printer.

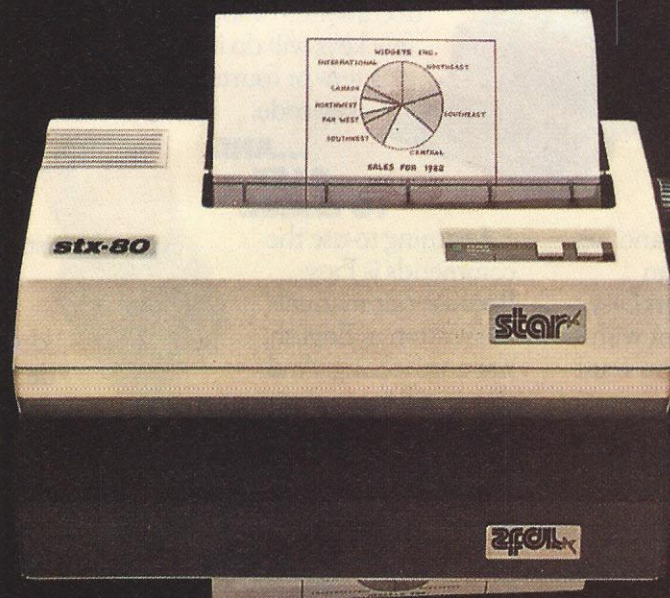
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CIRCLE 72



The new STX-80 printer for only \$199.*

BOOK REVIEWS

(continued from page 166)

A no-frills guide for the small businessman

HOW TO SELECT YOUR SMALL COMPUTER . . . WITHOUT FRUSTRATION

HILLEL SEGAL AND JESSE BERST
PRENTICE-HALL, INC.
ENGLEWOOD CLIFFS, NJ
208 pp., \$14.95 paperback,
\$22.95 hardbound

There seems to be no end to the number of books devoted to helping the small business owner buy a computer. *How to Select Your Computer . . .* is yet another in this genre. It's above average for its class, but it contains few, if any, startling new observations. Like its companions, this book says "Be cautious, do your homework and get plenty of advice." That's the sort of instruction parents hand down before their offspring go off to college. I suspect that many businessmen pay little more attention to those recommendations than young adults departing the nest.

One useful feature, however, is the step-by-step approach recommended by the authors. The first section is devoted to the decision to buy a computer. The authors admit the decision to buy may not always be the smartest, and there are plenty of small businessmen who will attest to that. However, having decided that a computer purchase can be justified, the authors feel that the next decision is choosing the software.

After considering software, the authors move on to questions of selecting a vendor and then, finally, to making a choice of suitable hardware. Each chapter has one or more worksheets to aid in the decision making. Although I'm no fan of worksheets, these appear to be sensibly constructed and helpful if the business owner or manager can find the data needed to fill out the sheets.

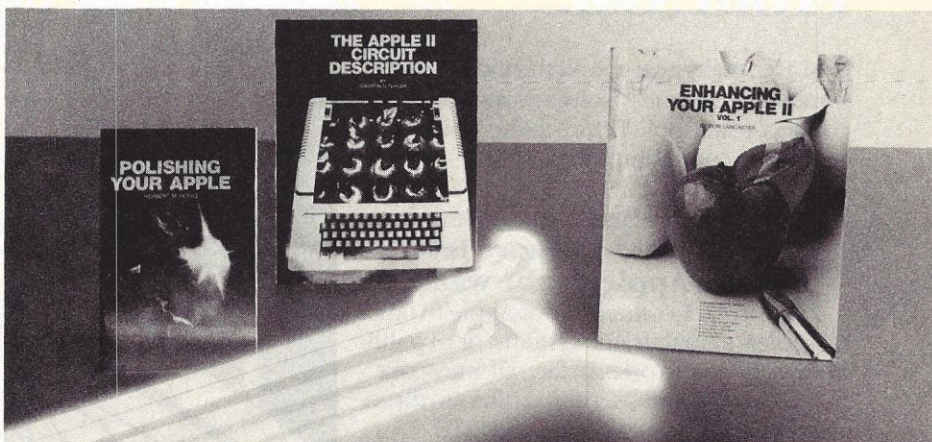
—Jeffrey Bairstow



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APPLE INTERFACING brings you tested interfacing circuits that work, plus the necessary BASIC software to connect the Apple II to the outside world. No. 21862, \$10.95.

MAIL TO: Howard W. Sams & Co., Inc.
4300 West 62nd Street, P.O. Box 7092,
Indianapolis, IN 46206

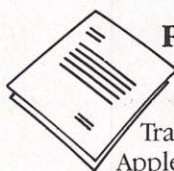
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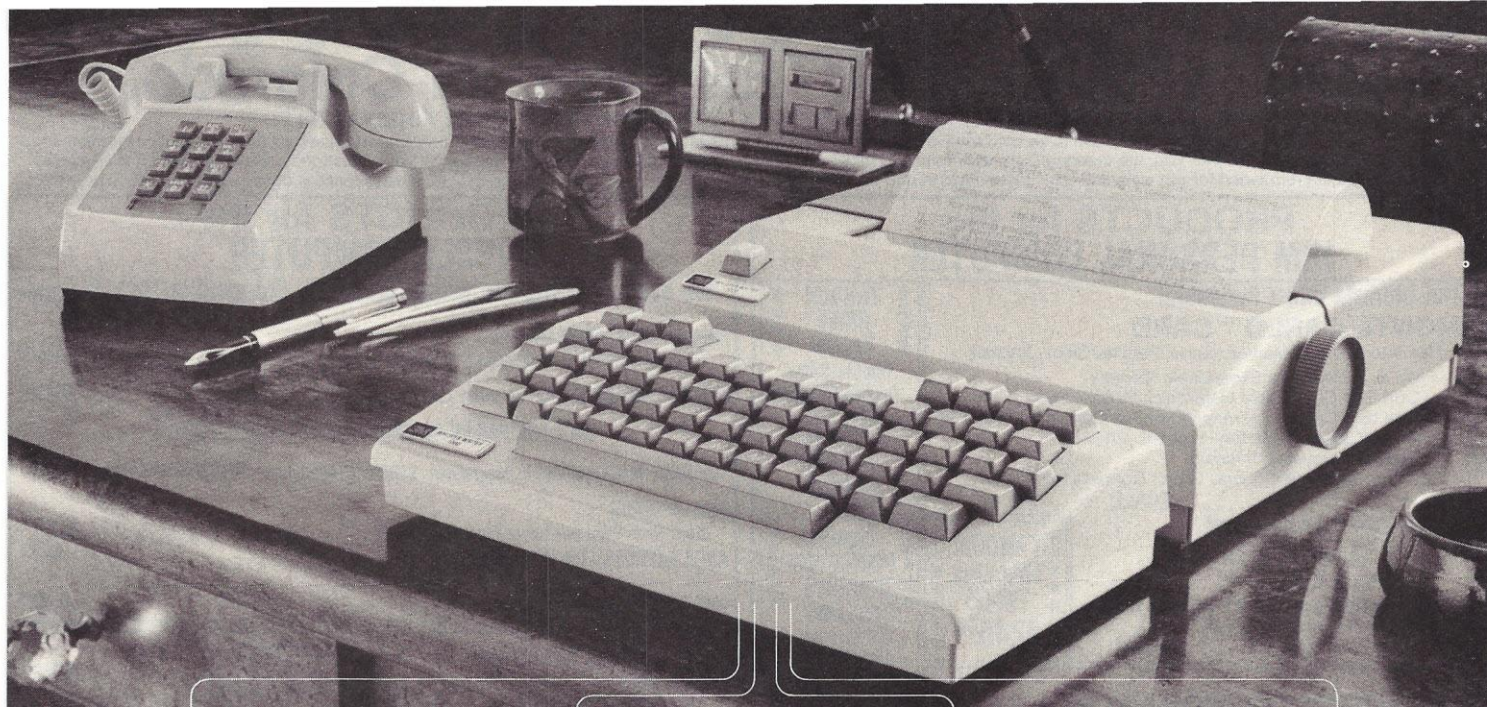
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| Transpak 2 | Transend 2 Electronic File Transfer | 300-baud Modem Card |
| Transpak 3 | Transend 3 Unattended Electronic Mail | 300-baud Modem Card |
| Transpak 2 + | Transend 2 | TransModem 1200 with serial interface and cable |
| Transpak 3 + | Transend 3 | TransModem 1200 with serial interface and cable |

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Whisper Writer communicates via phone lines; an RS-232C version is also available.

3M's Whisper Writer. It's like having four machines for the price of one.

- ☐ A teleprinter for TWX and telex.
- ☐ A desktop terminal for communicating with a mainframe computer, DDP network, time-sharing service, or electronic mail network (including 3M's new Whisper Exchange).
- ☐ A means of direct access to any ASCII terminal that has a telephone modem.
- ☐ A portable terminal for all of the applications above.

Best of all, you can enjoy all of this communications flexibility at a price that's less than you'd pay for most single-purpose devices.

Buy only the hardware you need.

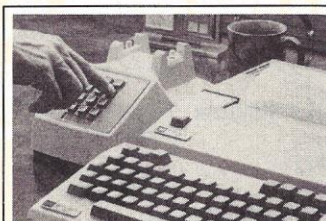
In its standard configuration, the Whisper Writer comes with an internal modem, telephone jack, and programmable automatic answering feature. A carrying case with acoustic adapter is optional. An RS-232C interface for the modem is desired.

The Whisper Writer's unusually quiet thermal printing mechanism prints sharp, black-on-white characters at 35 cps.

If you wish, you can buy the printer alone for RO applications and upgrade to full Whisper Writer status by buying a plug-in keyboard module later on.

Easy to learn, simple to use.

The separate keyboard module uses the conventional typewriter layout. Additional function keys reduce the need for memorizing special control codes. In applications involving computer access or electronic mail, you can even automate your log-on sequence.



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Whisper Writer's dot-matrix printer has already demonstrated its durability in more than 55,000 home and small business computer systems. Whenever maintenance is required, it's

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Quiet Printers, Color Monitors And Software Links

Each month Personal Computing scans the hardware market to keep you up to date on everything that's new. Those products we consider to be most useful and exciting in this month's crop are described in this section and commended for your closer examination. Others are listed in Showcase of Products, our special subscriber section.

NEW DEVICE ENABLES IBM PERSONAL COMPUTERS TO RUN APPLE II SOFTWARE

Quadlink, from Quadram Corporation, constitutes a major leap forward for the computing industry in that it allows an IBM Personal Computer to emulate an Apple II. This means IBM owners can use the software base that exists for Apple computers. Nothing has to be converted or reformatted—the IBM just acts like an Apple.

Users can load a disk with an Apple program on it, use it, then save files onto the IBM's drives. Those data disks can then be read by an Apple (or another Quadlink-equipped IBM).

In our demonstration, we loaded Bank Street Writer into a Quadlink-equipped IBM Personal Computer. Bank Street Writer is well protected, making it more demanding on a system, but it worked fine—a good test of Quadlink's effectiveness. We also tried some low-

resolution Apple graphics programs and discovered they wouldn't generate a proper display. But most contemporary Apple graphics software uses the high-resolution graphics mode, which Quadlink emulates perfectly.



Photo by Rob Wheelless Studio

The Quadlink board can be easily installed in one of the IBM Personal Computer's expansion slots.

The Quadlink card occupies one of the IBM's expansion slots. The board includes 64k of RAM; parallel and serial ports for operating printers and modems; and a game port (both Apple and IBM compatible) for joysticks, game paddles, trackballs, etc.

Quadlink switches from IBM to Apple mode with one-key commands. Quadram says all IBM enhancements (printers, buffers, etc.) can also be used while running Apple software.

Quadlink works on IBM Personal Computers and IBM XT's, and costs \$680.

FOR MORE INFORMATION: QUADRAM CORPORATION, 4357 Park Dr., Norcross, GA 30093, (404) 923-6666.

CIRCLE 415

—Lee The', Associate Editor

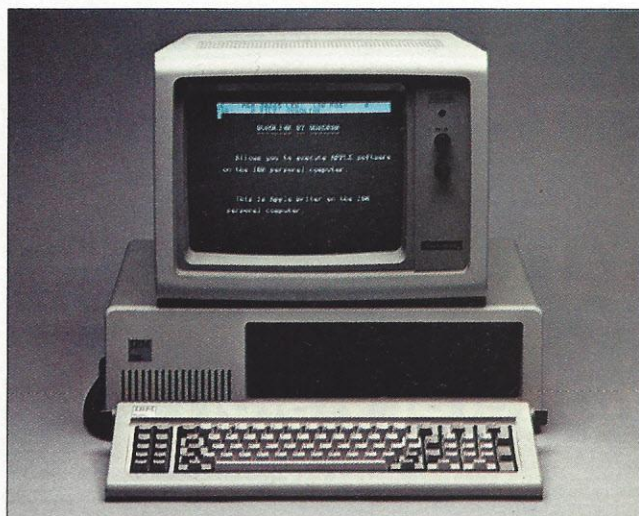


Photo by Rob Wheelless Studio

Quadlink, from Quadram Corp., enables IBM Personal Computer users to access the Apple II's software base.

NEW AMDEK DISK DRIVE FOR APPLE IIE, II PLUS

If you've been thinking of getting a second disk drive for your Apple IIE or II Plus, here's a unique way to go—the Amdisk-1 3-inch disk drive. This intriguing little unit could be a good second drive for you for several reasons. First, you'd be hard-pressed to find a more economical

ONE



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CIRCLE 76

drive/diskette setup (more about that later), and Amdisk-1 emulates a standard Apple drive, so you don't have to reformat anything. The plastic-armored 3-inch disks are easier to deal with than 5¼-inch floppies and can be flipped over, providing twice the storage capacity of a conventional floppy. Finally, the disks and drives can handle much higher storage densities if and when Apple upgrades its DOS (Disk Operating System).

The Amdisk is so small that few desks will be too crowded to accommodate one. To install it, you just pry off the Apple's lid, locate the disk controller card in expansion slot number six, and plug the drive into the bottom set of prongs. The drive will plug into other manufacturers' disk drive controller cards, too.

The Amdisk-1 has several notable convenience features. A metal cover protects the diskette read/write slot whenever it's outside the drive. Recessed sliding latches on either side of the disk automatically open the slot when you slide the diskette into the drive, and close it when you remove the diskette. Disk sides are marked "A" or "B," and can be write-protected without having to fuss with self-adhesive write-protect tabs. Instead, you take a ball-point pen and move a little slide switch into the "protect" position. A small round window in the disk turns red to show the protected status of that side of the disk. But the nicest feature of all is simply the size. The entire disk in its shell measures $3\frac{1}{8}$ by $\frac{1}{16}$ by $\frac{3}{16}$ inches, and of course it needs no sleeve.

When you want to remove the disk, you punch a rectangular button under the disk slot, and the disk pops out. And as with conventional drives, you can scramble the data on disk if you punch the eject button while the computer is writing to disk.

When you've filled one side with data, you can flip over the disk and fill the other side—but don't confuse this with double-sided drives, which can read/write on both sides more or less at once. The Amdisk can be used that way, but the drive is single-sided. However, the drive and disks can handle more data than the standard Apple 143k RAM capacity. For instance, the same drive mechanism and disks in Amdek's IBM dual 3-inch drive can handle about 200k formatted per side.

All this praise for the Amdisk-1 might have you wondering why you shouldn't just buy two of them and forget floppy drives. Unfortunately, you can only do that if you limit yourself to unprotected applications software, and get your dealer to download your packages to 3-inch disks. No, you still need floppies. To complicate things further, there are at least two incompatible 3-inch formats out (Amdek's Hitachi format and Sony/Hewlett-Packard's Sony format), with more to come. You could find yourself out on a technological limb, though it's also possible for several formats to coexist... much to the distress of software manufacturers. Amdek's format is

well worked out, certainly. The earliest 3-inch formats lacked automatic slot-protector retraction, for instance. The drive seems to work well, too. Amdek reports that it consumes a little less power than the standard drive, and



The floppy disks used with the Amdisk-1 3-inch disk drive can be flipped over, providing twice the storage capacity.

that 3-inch drives on the whole benefit from the small disk diameter, which is less susceptible to read/write errors due to thermal expansion of the disk medium itself. The maker's reputation is a critical consideration in evaluating a new class of product, and Amdek has made a solid name for itself with a line of high-quality monitors, and a dual 3-inch drive with its own power supply.

We saved the best news for last: The Amdisk-1 lists for \$299, and boxes of 10 disks cost \$70—comparable to 20 floppies. People with space or budget restrictions, or who have to carry around diskettes a lot, should pay special attention to Amdek's latest technological feat.

FOR MORE INFORMATION: AMDEK CORPORATION, 2201 Lively Blvd., Elk Grove Village, IL 60007; (312) 364-1180.
CIRCLE 377

—Lee The', Associate Editor

NEW PRINTER COMBINES SPEED WITH QUIET OPERATION

For many people, the term "dot-matrix printer" is synonymous with Epson's MX-80. Now Epson has introduced its latest printer, the FX-80, incorporating the popular features of the MX-80 with new enhancements and capabilities.

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Most users will likely take advantage only of the more standard features Epson has packed into the FX-80's 14-by 17-inch footprint. They'll buy the printer for its price, reliability, reputation, good print quality, streamlined



Epson's latest printer, the FX-80, offers streamlined operation, low noise level, high speed, and a built-in 2k print buffer.

operation, low noise level, high speed, and built-in 2k print buffer.

But the FX-80 can also be a good tool for users who want to stretch their computer's capabilities. The FX-80 can be programmed to print any character set or symbol—up to 256 characters at once—definable in a 9 by 11 matrix. These character sets can be printed in a variety of print styles, including emphasized, double emphasized, condensed, proportional, elite, pica, italic, enlarged, and double-strike. Underlining, and super- and subscripting are also available.

Many of these modes can be mixed to produce output that almost looks as if it came out of a book. Users can choose from several international character sets including French, German, English (UK variety), Danish, Swedish, Italian, Spanish, and Japanese.

The FX-80 prints graphics, too. It has several dot-addressable graphics modes, all of which feature a one to one horizontal/vertical ratio for undistorted shapes—for example, it can print a perfect circle. At its highest density the FX-80 prints 240 dots per inch horizontally and 216 dots per inch vertically. Bidirectional paper feed makes more complex graphics figures possible.

The FX's operations form a superset of MX-80 operations. If you're familiar with the MX-80, you can simply treat the FX-80 as a faster, more convenient version of its predecessor until you master the advanced functions. This similarity allows easy configuration of applications software since most programs with automatic printer configuration include the MX-80 in their lists.

The printer connects to the computer with a standard Centronics-type parallel connection (serial and IEEE-488

connections are optional), and contains a cartridge ribbon that snaps in quickly. Unlike the MX-80, the FX-80 has a paper tear-off bar that produces a neat tear if used at the perforated edge of the paper. The tear-off bar and the heavy shrouding of the case (for soundproofing) mean the user can't see what's being printed until several lines have been printed.

One outstanding characteristic of the FX-80 in operation is its resistance to paper jams, a longtime bane of fast dot-matrix printers. It just cranks the paper through and prints the way it's supposed to. For many people, this may prove the FX-80's most significant feature.

The FX-80 print head is rated at two million characters, and is user-replaceable. Epson says the print head will last longer, but that any print head will, after a million or so characters, start to blur. This happens because the impact pins become blunted from all the pounding. Epson's philosophy is to make the print head no more expensive than is necessary to make it last until the pins get blunt.

The FX-80 lists for \$699.

FOR MORE INFORMATION: EPSON AMERICA, INC., 3415 Kashiwa St., Torrance, CA 90505; (213) 539-9140.

CIRCLE 394

—Lee Thé, Associate Editor

NEW RADIO SHACK MODEL 4 COMPUTER

In the economical professional-grade computer category, you'd be hard pressed to match the new Radio Shack Model 4 for versatility and value for the money. A 16k RAM version using cassette tape storage will suit low-budget buyers. On the other hand, a small business could go for a Model 4 with all the trimmings: 128k RAM, Radio Shack's new Model 4 TRSDOS and CP/M Plus disk operating systems, four 184k (formatted) floppy-disk drives, and 20Mb of hard disk storage. Both these new operating systems allow applications software to address up to 128k, instead of the 48 to 64k of earlier versions. The extra RAM will accommodate applications programs with larger data space than most current 8-bit programs, as well as faster operation of large programs.

The Model 4 replaces the popular Model III, while retaining full software compatibility. The main version of the Model 4 comes with 64k memory expandable to 128k; 80-column by 24-line upper-/lowercase display; Z80A microprocessor running at 4 MHz—double the Model III's speed; keyboard with 12-key numeric keypad and three programmable function keys; one or two 184k floppy disk drives; sound; and five built-in peripheral device ports for connecting things like additional floppy drives, a modem, printers (via parallel connector), hard disk drives, a graphics board, and a cassette recorder. Two pieces of software come standard: Model 4 TRSDOS and Microsoft BASIC. The TRSDOS has a provision for con-

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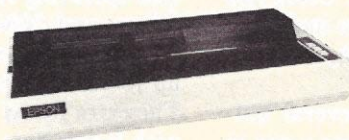
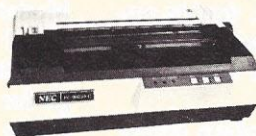
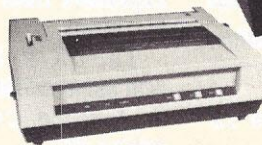
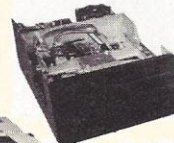
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verting Model III files to run with programs using Model 4 TRSDOS. Model I owners can buy Radio Shack's LDOS, which generates Model 4 TRSDOS-compatible files. Radio Shack will also be selling CP/M Plus for the 4, along with the CP/M-based language CBASIC. This will give the Model 4 one of the largest bases of productivity software of any computer made.

The all-in-one packaging of the Model 4 eliminates tangles of wires connecting CRT, CPU, keyboard and disk drives, but you trade off some flexibility in placement of these elements in exchange for simplicity of installation. Our demonstration unit—a two-drive model—had an attractive bone finish, with a matte texture on both case and keys for non-slip handling. It takes up less than 19 by 22 inches on your desk. Printer, modem, and extra drives etc. all plug in back and underneath, neatly out of the way.

The keyboard has a selectable keyclick feature, giving auditory feedback many typists find helpful. It's a soft sound, but you don't need a louder one because the Model 4 is cooled by convection and has no noisy fan. However, the click sound's loudness is software-controllable. Large, easy-to-find CLEAR, BREAK, and CONTROL keys make typing easier. A concave key plane allows your fingers to sweep from top to bottom of the keyboard without your hands having to change height. And new software utilizing the three function keys will enhance working on the Model 4. The RESET key, which clears your RAM, is carefully situated away from the rest of the keys. We had trouble getting used to having two cursor control keys at the left side of the keyboard and two at the right, but overall the Model 4 has one of the more typist-friendly keyboards around.

You get a wide range of mass storage with the Model 4. The hard disk drives come in 5Mb units, and up to four of them can be daisy-chained to your computer. All the floppy drives are similar 5¼-inch units. Their 184k capacity is about par for machines in the Model 4's price class. So is the 64k RAM standard on disk drive-equipped Model 4's, while the 128k option will be necessary for much new software. Also, Model 4 TRSDOS can use extra memory for phantom disk drives and print spooling. The former lets memory emulate a disk drive for high-speed disk-intensive work; the latter stores data to be printed in a buffer, freeing the computer for continued work while printing. A forms utility lets you control printing formatting also. And TRSDOS supports loading cassette-based files created with the TRS-100 portable computer.

Model 4 prices are as much as \$1000 less than some competitive machines with comparable features. The two-drive, 64k unit is only \$1999; the one-drive unit, \$1699; and the 16k unit is \$999 (without cassette recorder). The 64k additional RAM option costs \$149 plus installation, and can be used to bring the \$999 computer up to 64k as

well as increasing any 64k machine to 128k. An additional internal disk drive costs \$649 plus installation for the first drive. The computer will be sold at Radio Shack stores nationwide, and supported through a customer hotline service staffed by 154 service experts located in 37 states. The Model 4 represents a growing realization by industry and buyers alike that software holds the key to computing happiness for many people. Its hardware spec-



The new Radio Shack TRS-80 Model 4, a replacement for the popular TRS-80 Model III, offers both CP/M and TRSDOS.

ifications are nice—and really cost-effective—but the glory of the machine is its ability to access two huge bases of software—CP/M and Models I and III TRSDOS—and to support the supercharged software planned for CP/M Plus and Model 4 TRSDOS.

FOR MORE INFORMATION: RADIO SHACK, 1800 One Tandy Center, Fort Worth, TX 76102; or contact your local Radio Shack dealer or Computer Center.

—Lee The', Associate Editor

MINIATURE EXPANSION DEVICE FOR APPLE IIE AND II PLUS

One of the Apple II's most desirable features has always been the abundance of hardware and software available for it. Few other personal computers can be customized so easily. But the problem, as far as hardware is concerned, is that there are only so many slots available inside the computer to hook up peripherals.

Now Southern California Research Group has introduced a product called Switch-A-Slot, which gives the user a four-slot expansion chassis in a box the size of a disk drive. The device plugs into any slot inside the Apple. A four-position switch on the front of the device allows the user to select which expansion slots should be engaged while the others remain inactive.

Switch-A-Slot will be useful to Apple owners who have run out of slots, are running more than one slot-dependent card in a given slot (this is especially true for people working in Pascal or CP/M operating systems), or want to minimize heat buildup and power consumption in their systems (many cards draw power whether or not they're in use, but Switch-A-Slot cuts power to all but the selected slot).

Switch-A-Slot will be a boon to users who have several



A four-position switch on the front of the Switch-A-Slot allows the user to select which expansion slots should be engaged.

kinds of printers. Repeated insertion and removal of cards can wear out both the cards and the slots, with expensive consequences. Switch-A-Slot allows users to insert a serial card for a letter-quality printer in slot A, a parallel card for a dot-matrix printer in slot B, and a card for a printer/plotter in slot C. Then all data can be printed through slot 1—no need to reconfigure programs or muck around with the computer's interior. Not only is it less hassle, but the risk of damage to the computer is reduced.

A user can also have more than one Switch-A-Slot on his computer. For example, our hypothetical printer user might also have an RGB display card and a clock card which both have to go into slot 7. Or he could put another Switch-A-Slot in the Apple's slot 2 and use it for a modem card, a voice synthesizer, and a light pen. This allows the user to control a variety of projects at different times without having to change setups.

The Switch-A-Slot's 18-inch cable does not allow the user to put RAM or alternate processor cards in the device. It would take signals too long to traverse the cable. The user is also limited to cards no longer than 9¼ inches.

Installing the Switch-A-Slot is not complicated. The device's interface card can be inserted through medium-

size slots in the Apple IIe, and a long tab in the front of the card makes it easy to lever it into the slot the user chooses. The lid of the device pops off so the user can install his cards. Then he takes a pencil or felt-tip pen and marks the slot designation blanks on the front of the chassis, and which slot in the Apple he has used.

Switch-A-Slot costs \$180.

FOR MORE INFORMATION: SOUTHERN CALIFORNIA RESEARCH GROUP, P.O. Box 2231, Goleta, CA 93118; (805) 685-1931. CIRCLE 439

—Lee The', Associate Editor

NEW PRODUCTS, SERVICES, AND PRICE REDUCTIONS FROM IBM

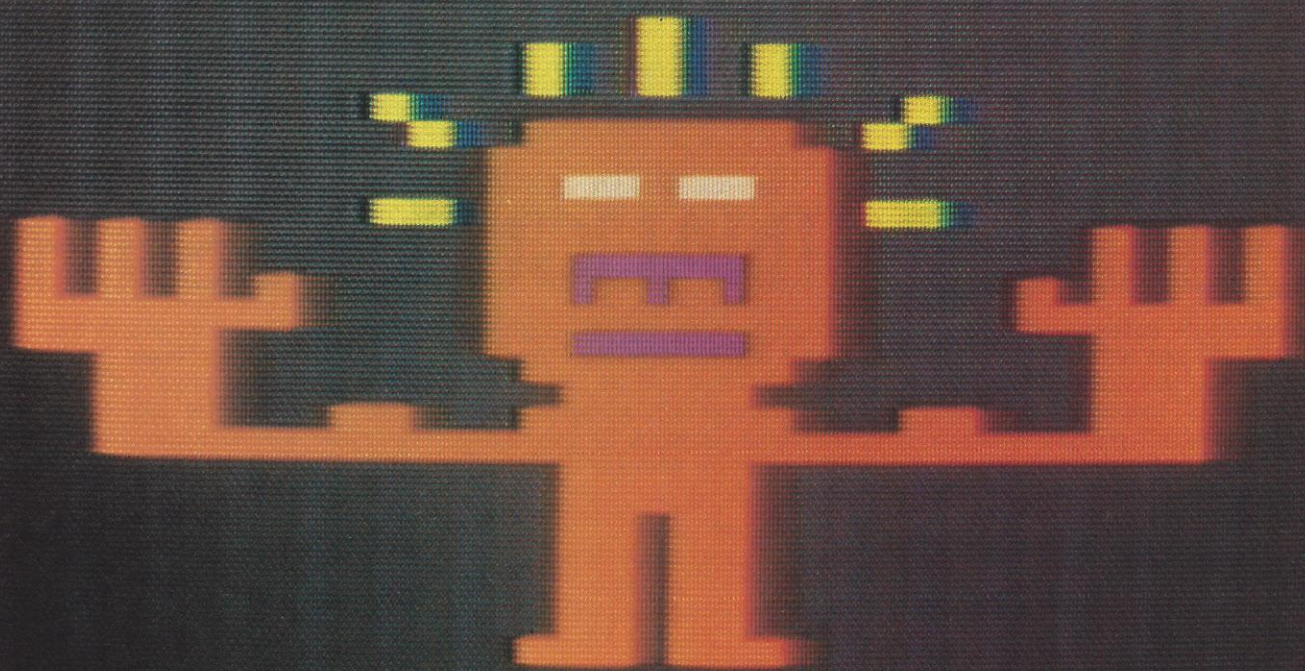
IBM has introduced a broad range of new products and services, along with an approximate 15 percent reduction in the prices of current personal-computing products. Highlights include:

- The new hard-disk version of the IBM Personal Computer, called the XT,
- An Expansion Unit for the Personal Computer and the PC XT, with a 10Mb hard disk drive and five user-available expansion slots,
- A 10Mb hard-disk module to add to the expansion chassis,
- A new high-resolution color monitor,
- An alternate disk operating system, PC DOS 2.0,
- A series of Peachtree Software programs adapted to PC DOS, including Peachtext (word processing), and Version 1.1 of Peachtree's accounting packages, with General Ledger, Accounts Receivable, Accounts Payable, Inventory Control, and Payroll,
- A customer support operation at authorized dealers, consisting of an XT computer set up with extensive IBM product information directly available to customers, with technical support also planned via a telecomputing link to IBM's Tampa data-processing complex.

The IBM PC XT computer features a 10Mb hard disk drive, a 369k double-sided floppy disk drive, room for a second single- or double-sided disk drive, 128k RAM, a communications port, and five user-available expansion slots. There are three more slots occupied by the port and controller cards for the two disk drives.

IBM's Expansion Unit contains a 10Mb hard disk drive, with room for a second (or floppy) drive, and eight expansion slots. A PC XT could thus acquire 30Mb of total hard-disk storage capacity. The expansion unit adds a total of five slots to an IBM Personal Computer system. One slot each in the Personal Computer and in the Expansion Unit is required for the interface cards linking them. And the hard disk in the expansion unit consumes another slot. Of the six slots left in the expansion unit, two will accept only a smaller expansion card. You cannot put

(continued on page 187)



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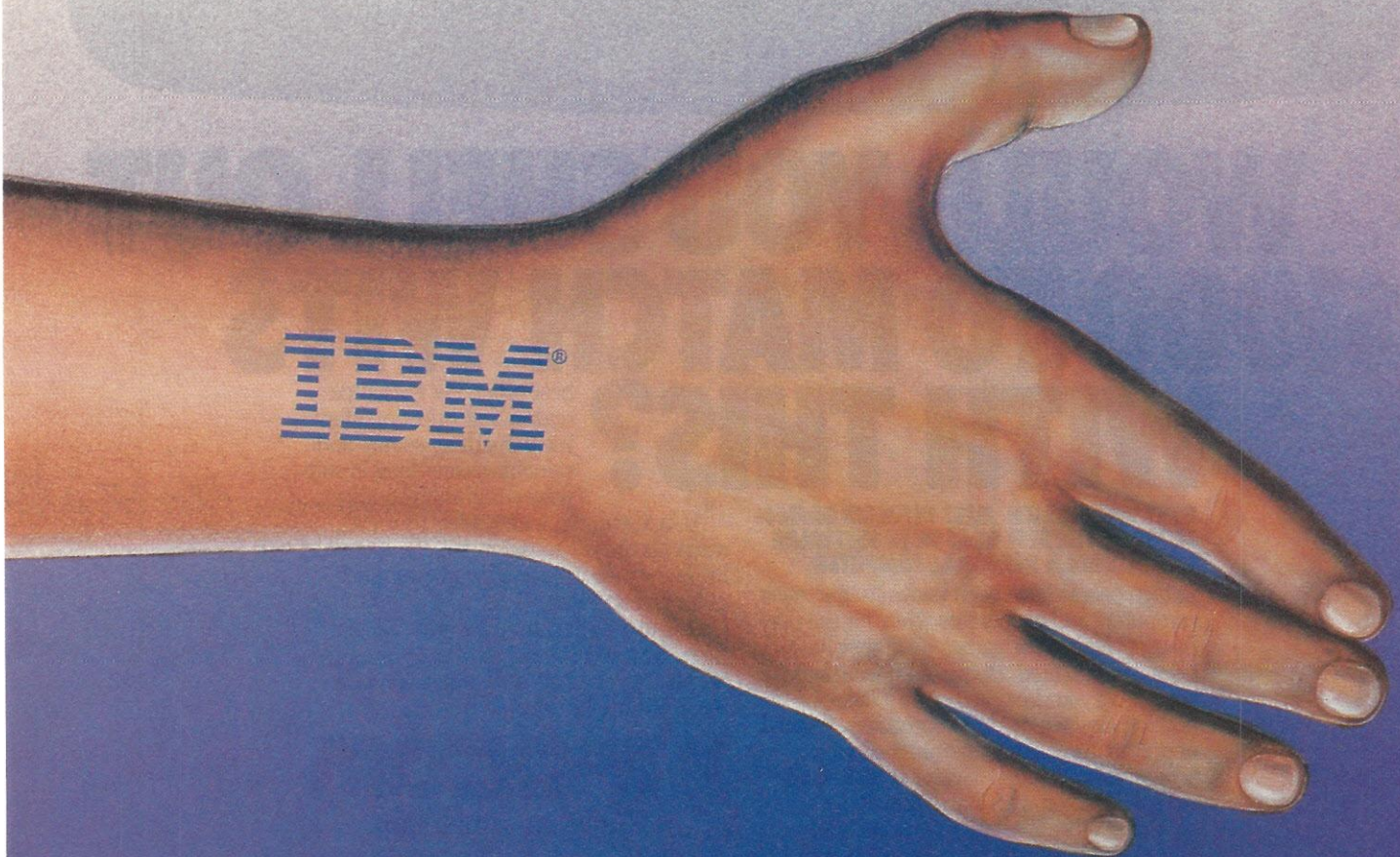
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Quadlink plugs inside IBM PCs. No conversion or reformatting of diskettes needed. Just load Apple software in the IBM and key one

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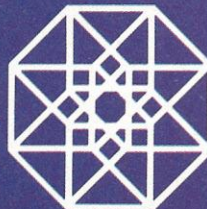
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CIRCLE 82

(continued from page 182)

certain cards in the Expansion Unit—mainly memory cards, diskette adapters, and the primary monitor/display attachment card. The Expansion Unit takes up 20 by 16 inches of desk space.

The new color display works off the IBM Color/Graphics Monitor Adapter. The 12½-inch screen has up to 640 by 200 resolution, 16 colors, black mask contrast, and front-mounted brightness and contrast controls. It costs \$680.

The new DOS 2.0 operating system has features that allow an IBM Personal Computer to operate single- and double-sided floppy diskettes and hard disk drives, chain application programs in a predefined job stream, do graphics screen dumps, and more. It takes up 12k more computer memory. For this and other reasons, DOS 1.0 or 1.1 may still be needed to run some current applications programs for the IBM Personal Computer. DOS 2.0 costs \$60.

The addition of Peachtext to programs available under

PC DOS adds a highly respected word processor to IBM's lineup. Peachtext's Personal Computer version costs \$400. The new Versions 1.1 of the five accounting modules (General Ledger, Accounts Receivable, Accounts Payable, Inventory, and Payroll) cost \$595 each. Owners of Versions 1.0 can upgrade each program for \$120.

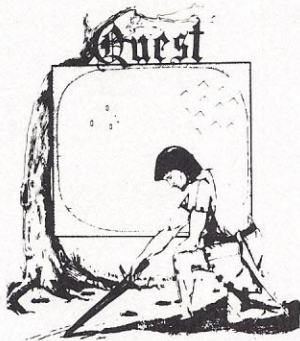
Here are some examples of IBM's price reductions on current products. The price of a Personal Computer System Unit with keyboard is lowered by \$300-\$400, depending on disk drive setup. A memory expansion card with 256k is reduced by \$230, from \$1075 to \$845. The color/graphics monitor adapter drops \$56, from \$300 to \$244.

The base system lists for about \$5000, plus monitor, printer, and software. An annual maintenance agreement costs \$155 for mail-in, \$175 carry-in, or \$220 by courier. The Technical Reference XT manual costs \$53; the Hardware Maintenance and Service XT manual costs \$153; and the Guide to Operations XT manual costs \$50.

(continued on page 190)

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HARDWARE OF THE MONTH

(continued from page 187)

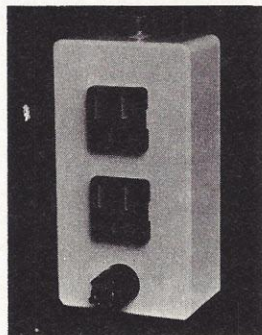
The Personal Computer version of the Expansion Unit costs about \$3400, while the one for the PC XT costs about \$2700. The additional hard disk drive adds about \$2400 with adapter card included. An annual maintenance agreement costs \$70/\$80/\$100 for mail-in, carry-in, or courier service; and the hard disk costs \$165/\$190/\$235.

FOR MORE INFORMATION: IBM, P.O. Box 1328, Boca Raton, FL 33432; (305) 998-2000.

CIRCLE 457

LARGE SCREEN COLOR MONITOR OFFERS AUDIO CAPABILITY

USI's new color monitor, the Color 1400C, is a reasonably priced step up from using a color TV as a display monitor. The monitor plugs directly into most computers, and includes audio capability. When used with a 40-column display, it's sharp enough for word processing.



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CIRCLE 85

The USI 1400C is a particularly nice composite monitor. The 14-inch screen makes it easy for more than one person to see the display at the same time. Controls are located behind a panel below the screen. It's a great location for them since computer owners often find themselves fiddling with the controls as they move from one application to another.

The 1400C has some less obvious advantages, too. The rectangular metal case provides better heat dissipation than a plastic case. And although the CRT lacks glare protection, its flat front panel allows the user to add a glare screen.

Another potentially useful feature of the Color 1400C is its video/audio outputs. These allow the user to daisy-chain other monitors to it, so if he already has or plans to purchase a monochrome monitor (recommended for 80-column word processing) he can hook up both monitors at once.

The USI 1400C lists for \$399 plus cable.

FOR MORE INFORMATION: USI COMPUTER PRODUCTS, 71 Park Lane, Brisbane, CA 94005; (415) 468-4900.

CIRCLE 397

—Lee The', Associate Editor

PROFESSIONAL COMPUTER AND IMPACT PRINTER DEBUT

Texas Instruments has introduced the TI Professional Computer, a personal computer designed for professionals, administrators, and other workers in information-intensive businesses.

The TI Professional Computer's suggested retail price of \$2595 includes a monochrome display, keyboard, system unit with 64k RAM, and integral 320k floppy disk drive. This configuration can be upgraded for more complex applications by adding more memory, mass storage, communications, and other options.

The computer features high-resolution graphics using a 12-inch monochrome display or optional 13-inch color display. Both displays use the same format—25 lines of 80 columns, and 720 by 300 pixels with the graphics controller option. This allows applications programs to operate with either display without modification.

Several communications options are available for the TI Professional Computer in network environments.

Texas Instruments has also introduced a new impact printer, the OMNI 800TM Model 850, as a companion printer to the TI Professional Computer. The Model 850 prints at up to 150 characters per second and offers a variety of fonts and print options, such as compressed and enhanced print.

FOR MORE INFORMATION: TEXAS INSTRUMENTS, P.O. Box 402430, Dallas, TX 75234; 1-(800) 527-3500.

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CIRCLE 90

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Equation Solvers, Training Courses, And Educational Games

Each month Personal Computing scans the software market to keep you up to date on everything that's new. Those products we consider to be most useful and exciting in this month's crop are described in this section and commended for your closer examination. Others are listed in Showcase of Products, our special subscriber section.

QBASE DATA-BASE MANAGEMENT PROGRAM IS DESIGNED TO PREVENT INPUT ERRORS

Appplied Software Technology has designed its Qbase data-base manager to prevent annoying and destructive input errors. Once you've designed a particular record format, entering data can be as easy as filling in the blanks, and the program will check for relevance and accuracy at every step. You can even have Qbase automatically calculate things like sales tax and total price of an item, once its name, unit price, and the number sold have been entered. Qbase can be used for managing both files and forms, though it's forms-oriented.

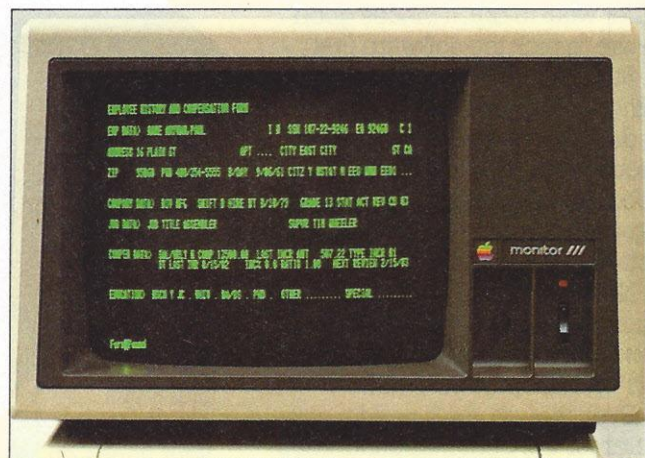
Qbase heads off input errors in several ways. For example, with list checking, you enter a list of allowable entries (and spellings) for a given section of your form. With the mandatory items feature you can have the program refuse to save a filled-in form to disk unless the mandatory items have been filled in (like a ZIP code). You can limit the numeric or alphabetic range and the length of items. Numbers can be justified left, right, or on the decimal points, and numeric items can be set to accept only numbers (avoiding some typos). Calculations can be done either automatically or using the on-screen simple calculator without having to leave the program—and fewer steps means fewer errors. Finally, checkoff items accept only a yes or no entry. This array of checkpoints should make it 100 percent harder for clerical errors to sneak into your business records. And you're free to choose the checkpoints that suit your operation best.

This same concern for data-base reliability extends to data integrity. The Qbase package provides five disks, four of which can be copied to provide backup. The fifth is copy protected, but you get a backup copy when you send in your registration. The manual shows you how to maintain Structured Backup: a three-tiered backup system for files that are maintained and updated daily. With Structured Backup you should never lose more than the last day's data.

The report generation function allows you to analyze

records. You can sort on any file items, and sort data in three ways, using up to nine selected conditions. All the basic Boolean conditions are provided, like equal, greater than, and less than. You just move your cursor around your form and mark the key items you want to select, enter the conditions you want to apply—and what value you want the conditions to test against (up to three). You can print forms, mailing labels, and reports. The last are formatted automatically, with one column for each item printed. Reports can include subtotals and summary totals. You can also save your report design and use it later.

Unlike some structured data bases, Qbase allows for flexibility. You can change your form without having to



Once you have designed a particular record format, like the one shown above, entering data into the Qbase data-base manager can be as easy as filling in the blanks.

rekey all your data. Files are upward compatible with Applied Software Technology's Versaform, a high-end forms-oriented data-base manager. Each item can contain up to 78 characters, with item names up to 20 characters long. One Apple disk can hold over 1000 forms. The 40-column Apple screen can display up to 50 items.

The Apple version of Qbase we saw requires you to juggle five program disks (Design, File, and Report program disks; Tutorial/Utility and Report Work Disks), and some of the Pascal operating system conventions may seem strange to those new to Pascal—like having to label disk drives one and two, four and five. Only two drives are

(continued on page 196)

IF YOU'RE CONFUSED ABOUT BUYING A PERSONAL COMPUTER, HERE'S SOME HELP

Computers come in two parts.

One part is the "hardware," the machinery itself. The other is the "software," which tells a computer what to do, the way a driver tells a car what to do.

Without software, a computer can't do anything. And vice versa. You have to buy both.

Buy the software first.

Since the reason you're buying a computer is to get the capability the software gives you (remember it's the software that tells the computer what to do), it makes good sense to pick the software first.

Start by making a list of the things you want the computer to do. Possibilities include word processing, inventory control, accounting, graphics, recordkeeping—you name it, there's probably software that does it.

Next take your list into a computer store and ask the salesperson to demonstrate software that will do the things you want.

Even though you'll need a computer for the demonstration, keep in mind the computer is just a vehicle. The software is the driver. Once you've decided on software, picking the rest of the computer system will be that much easier.

The simpler the better.

Some people will tell you that software has to be complicated to be powerful. Nothing could be further from the truth.

Good personal software should be, as the computer people say, "friendly." Meaning that it helps you do what you want to do without getting in the way.

Good software keeps the complications in the computer, where

they belong. And keeps the capability at your fingertips. It's that simple.

Simply see for yourself.

You can read any number of interesting books and magazines about personal computers. You can ask your friends who have them.

Or look at all the sales literature you can get your hands on.

But as helpful as that can be, there's no substitute for a live demonstration.

When you do go shopping, we recommend you take a look at the PFS® Family of Software.

Designed the way we think a software family should be: simple, straightforward and powerful.



Currently there are four software packages in the family: PFS:WRITE, PFS:FILE, PFS:REPORT and PFS:GRAPH, with more on the way. Here's a little more about each of them.

PFS:WRITE. The simplest way to get your message across.

PFS:WRITE is ideal for people who want to make their writing time more productive. It displays what you write on your computer screen so you can make revisions as you compose.

With WRITE, you can correct misspellings or substitute one portion of text for another, with just a few keystrokes.

And when you're through revising, WRITE shows you "on-screen" just how your document will look when it's printed. So there are no surprises afterwards.

WRITE also works with most popular software programs, including the PFS Family of Software.

This feature allows you to add names and addresses from mailing lists to generate form letters. Or combine columns of numbers or graphs with your text.

PFS:FILE. The simplest way to get organized.

FILE is basically a paper filing system without the paper. So you can record, file, retrieve and review information in a fraction of the time it takes with a conventional filing system.

With FILE, you arrange your information on a "form" you design yourself. And when you need to track something down, FILE sorts through your records electronically. It lets you retrieve information in a variety of ways so you can be as selective as you want.

PFS:REPORT. The simplest way to sum it all up.

REPORT is a powerful analysis tool that works with FILE.

REPORT sorts through your files and retrieves the information you're looking for. Then assembles it all into one report, so you can analyze, plan and make better-informed decisions.

REPORT is also good at math. It quickly sorts through columns of numbers and performs calculations, so you won't have to.

PFS:GRAPH. The simplest way to spot trends.

GRAPH is ideally suited for professionals who need charts or graphs in a hurry.

All you do is specify the kind of graph or chart you want and enter the information. GRAPH does the rest.

GRAPH transforms columns of facts and figures into pie, line and bar charts so you can spot trends quickly and make better-informed decisions.

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PER 6/83

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SOFTWARE OF THE MONTH

(continued from page 193)

required, but three would be better, and the program will support several more if you have them. But the more intricate aspects of Qbase are balanced by the tutorial.

The 48-page Hands-On Exercise takes you all the way from form design, to data entry, to report generation, and works with the on-disk tutorial to help you become familiar with the program. Once you go through the exercise, the program diskette can't be used again—so make sure to back it up first! Actually, you do have to refer to the main reference manual to see how to format, copy, and back up disks. But after going through the tutorial and the manual, a 12-page Reference Summary booklet should be adequate for occasional review.

Qbase reflects the adage "Sin in haste, repent at leisure." Many a professional has thrown together a data base, only to find it too unreliable and unwieldy to use. Qbase demands forethought, and pays back on that investment handsomely. It runs on a 64k Apple II or IIe, or on a 128k IBM Personal Computer. Two drives are required, and the IBM's must be double-sided, and double-density. Printer line width can be up to 200 characters, by the way. Forty- or 80-column display is optional, with 80 recommended.

Qbase costs \$189.

FOR MORE INFORMATION: APPLIED SOFTWARE TECHNOLOGY, 14125 Capri Dr. #4, Los Gatos, CA 95030; (408) 370-2662. CIRCLE 270

—Lee The', Associate Editor

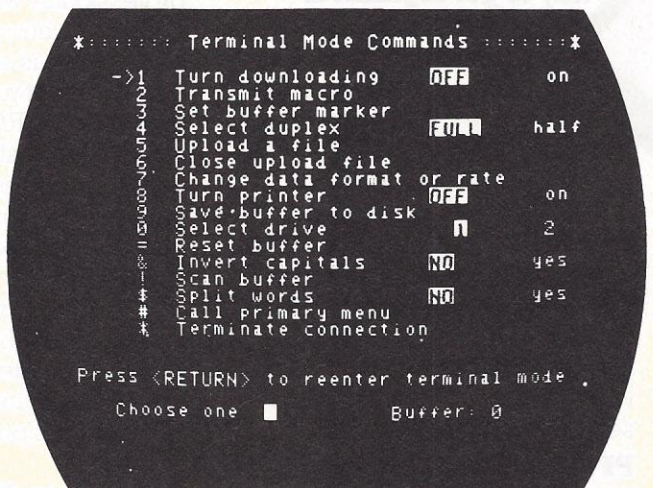
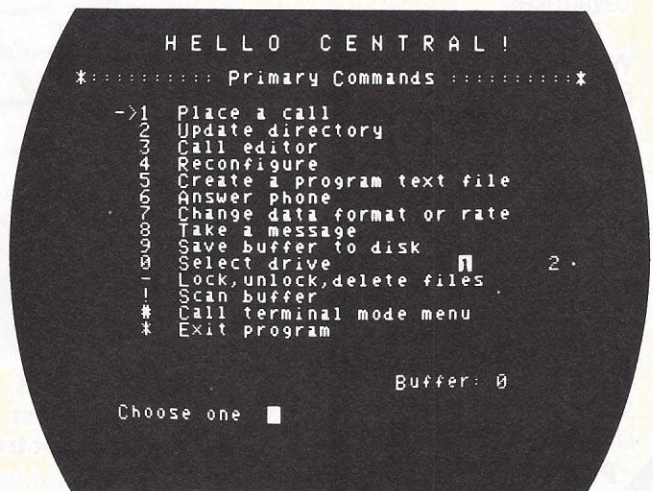
TELECOMPUTING SOFTWARE FOR APPLES INCLUDES MESSAGE-TAKING ABILITY

Hello Central! from Howard W. Sams & Co., is an innovative and powerful new telecommunications program that is also surprisingly easy to use. Someone fairly proficient with the Apple could probably learn to use the program in a few minutes just by using the command reference card and the eight main on-screen menus. Even a total beginner could be talking with a local computer bulletin board within a few hours, by using the tutorial and glossary in the 70-page manual.

In addition to the standard telecomputing capabilities, Hello Central! features automatic message-transmission and reception, automatic saving of files to disk if needed, an 18k file buffer with no line limits, a powerful integral text editor, and separate directories for voice and data phone numbers. It can upload and download any ASCII file, including BASIC and machine-language programs; and it can be configured to use lowercase hardware, plus the shift key wire modification on the Apple II Plus, and to drive a variety of printers. Although it has a 40-column display, it can be used to transmit or receive 80-column files. The manufacturer provides full-time hotline support

and modem transmission of program updates. In fact, perhaps the only desirable feature lacking in this program is the ability to save files to hard disk.

Hello Central! is provided on an unprotected disk, making it one of the few "copyable" telecomputing programs. This feature will be a boon to professionals whose business



Hello Central! command reference card and eight main on-screen menus make it easy for even the telecomputing novice to use.

depends on having vital programs and data backed up, and it eliminates the worry of the program rejecting your disk drive because the speed is slightly off—a frequent problem with the latest software protection methods.

Many professionals will buy Hello Central! for the automatic message reception feature alone. It lets you rig your computer to answer the phone, send a predetermined message to the caller's modem, receive the caller's message, and then save that message to disk. It can save one message after another, appending them to the same disk

file, up to a total of over 20,000 words, the limit of the diskette itself. Single messages can be any length up to that limit.

Field operation managers will take special note of the ability of Hello Central! to receive reports from the field after business hours and from different time zones. While a few other programs do offer such electronic mail capabilities, they require the same program on each end of the line, and tend to take a lot of work to get up and running. With Hello Central! you boot the program and arrive at the main menu 49 seconds later. You type "8"—"Take A Message"—and the program prompts you to name the disk file in which your message is stored, and the disk file incoming messages should go to. That's about it. Unfortunately, you can only use this feature with the Hayes Micromodem, but that's about the only limitation. If you don't need this feature, you can use Hello Central! with virtually any modem that connects to either an SSM AIO, Apple Communications Card, or a card that emulates either of these.

Our demonstration took place with the first set of documentation for Hello Central! The revision will come out around the time you read this—so if you have (or buy) the program with the first set of documentation, be sure to contact Howard W. Sams & Co. for the free revision. The earlier manual, which can be identified by its 1982 copyright, had no reference card and no tutorial. But even that version had some very nice details: Keys you're supposed to type are highlighted in red, and screen shots show the on-screen menus you use to move around in the program.

Using the program with a fancy Ven-Tel MD212 Plus, we were able to access the modem by using the "Pick Up The Phone" option on the main menu and hitting a few carriage returns to wake up the modem. Similar procedures will work for other direct-connect modems, and acoustic modems work with manual dialing. As long as you accept the narrow range of serial cards allowed, you can pretty much take your pick of modems.

Uploading and downloading files proved to be fast menu-driven procedures. For those who want to access mainframes computers, a terminal emulation mode—which allows you to send one line at a time with either manual or automatic prompting—is available. Furthermore, you can embed passwords and command sequences needed by various information utilities and mainframes. You can't use these with Sprint or MCI, though, because the feature only works with the Hayes Micromodem, and the Micromodem can't do the touch-tone dialing the long-distance phone services need.

Hello Central! will run in either half-duplex mode for full-speed transmission or full-duplex mode for half-speed. The full-duplex mode displays an echo of the data being transmitted on the sender's screen so the transmission can be checked for errors. Hello Central! can

detect a problem like a burst of static that obliterates a few characters, and it will mark the point where the error occurred with an "!" and a carriage return. If you're watching the transmission you can catch these glitches and correct them. This isn't a true automatic verified file transfer protocol, but it should be adequate for transmitting anything except large amounts of critical numeric data.

A text editor is needed in a telecommunications program to let the user whip out quick notes or clear garbage from transmissions before printing them or saving them to disk. The integral text editor in Hello Central! more than fulfills these needs. It actually provides a lot of the features proper word processors do—full cursor movement, text scrolling, search and replace functions, printer control, and the ability to move, copy, or delete blocks of text. However, you probably won't want to use it for a long writing task, since these functions are somewhat slower than with a true word-processing program. Still, in comparison to some telecommunications programs that have no editor at all, the text editor in Hello Central! is very useful, and gives you far more flexibility in handling the files you send and receive.

At \$99 for the manual and unprotected disk, Hello Central! rates as one of the better bargains in telecomputing. And the hotline support will please tyros and experts alike.

FOR MORE INFORMATION: HOWARD W. SAMS & CO., 4300 W. 62nd St., P.O. Box 7092, Indianapolis, IN 46206; (317) 298-5400. CIRCLE 455

—Lee The', Associate Editor

NEW SOFTWARE FOR PEOPLE WHO WORK WITH FIGURES

TK!Solver, from Software Arts—the creators of VisiCalc—is a sophisticated equation-solving program which also converts units of measurement, plots graphs, and makes tables. It's exciting news not only for engineers and scientists, but for businessmen who solve problems expressed in equations. This software frees up time you previously had to spend crunching numbers. You can use that time to explore your problems more creatively, letting the program do the legwork for you.

TK!Solver solves simple problems like figuring monthly payments on a car loan given different amounts of down payment, but it can also tackle more complex problems like calculating the natural frequency of vibration in rotational systems—the sort of thing mechanical engineers now solve on huge mainframe computers or with paper, pencil, and programmable calculators like the HP-41C.

A series of SolverPacks has been started to supplement TK!Solver. These offer software templates for solving typical problems in given fields. Each pack contains a

SOFTWARE OF THE MONTH

dozen or so models which include the equations, values, and tables needed to solve a given class of problem.

The first two packs available are Financial Management and Mechanical Engineering. Slated for future release are High School Science, and Building Design and Construction. A brief look at the titles of some models helps illustrate the scope of problems TK!Solver can address. The Financial Management pack contains models like Compound Interest Calculations, Net Present Value/Internal Rate of Return Analysis, Financial Statement Ratio Analysis, Analysis of Operating and Financial Leverage, Cost of Equity Capital: Dividend Growth, Cost of Equity Capital: Capital Asset Pricing Model. The Mechanical Engineering pack includes such models as Cantilever Beam, Fluid Flow in Pipes, and Area Moment of Inertia. The High School Science pack will include Metabolic Calculation, Gas Laws, Electrical Energy

(7o) Output: 1176.43784333 63 /

| St Input | Name | Output | Unit | Comment |
|----------|------|-----------|------|-------------------------|
| 95000 | H | | \$ | House price |
| | d | 19800 | \$ | Down payment |
| 20 | dp | | % | Down payment percentage |
| | p | 76000 | \$ | Mortgage |
| 30 | n | | yes | Term |
| 18.5 | i | | % | Interest rate |
| | A | 1176.4378 | \$ | Monthly payment |
| | T | 423517.62 | \$ | Total of payments |

===== RULE SHEET =====

S Rule

"Mortgage Model"

H=p+d
d=H*dp
A=p*(1/(1-(1+i)^-n))
T=A*n
Tip=T-p

TK!Solver solves simple problems like figuring monthly payments on a car loan or a mortgage, but it can also tackle the complex calculation problems usually done on mainframes.

Laws, and Projectile Motion. Building Design and Construction features Solar Heat Gain, Estimating Floor Framing, and Rafter Specifications models.

TK!Solver brings three special features to bear on problems like the ones listed above: iteration, backsolving, and unit conversions. Iteration means that TK!Solver can fire computational salvos at a problem that cannot be solved directly. Then by successive approximations it will arrive at a solution accurate to the needed degree. Backsolving means that you can set up an equation to solve for a given variable, then have TK!Solver solve for any other variables, without having to reformulate the equation each time. Unit conversions means you can set up the program to solve problems in whatever units of measure are most convenient, then have it automatically convert to another measurement system when needed—a big help to the metrically illiterate.

List solving, graphics, DIF files, and an on-line Help! function add to TK!Solver's versatility. List solving allows you to set up a whole list of values for your variables, and have the software run them past the same equation. This allows you to examine alternative solutions quickly. The program can produce, file, and print straightforward graphics, using normal keyboard symbols, so your printer doesn't need graphics capability. If you want to do fancier graphics, or exchange files with, say, your VisiCalc program, just use the DIF. This feature lets you move files between any programs that support DIF, like VisiCorp's Visi series, and Stoneware's DB Master data-base program. The DIF Clearinghouse Newsletter (from Software Arts) gives more details. Also of great use to the beginner is the on-line Help! facility which can be engaged at any time by typing "?" and naming the topic that has you stumped.

How difficult to learn is TK!Solver, anyway? Software Arts estimates that this program takes about as long to learn as VisiCalc—which can mean 10 hours—or 10 days. There is some similarity of command structure to VisiCalc, so people who have mastered VisiCalc should have a head start with TK!Solver. But Software Arts has really worked at making this program accessible to everyone who solves problems. The program package includes an 18-page introductory guide that gets you through a simple equation-solving process. Then you step into the 207-page instruction manual.

A colorful poster that presents a map of the program is included with the package. The left side of the poster displays the hierarchy of commands—about 42 of them including Copy Field, Edit Field, Delete, Save Model, and Plot Sheet. The right side shows the eight modes—called "sheets"—in TK!Solver. These modes are: Global (basic configuration of your model), Rules (either in English or mathematical equations), Variables (what you want to solve for), Units (of measure/of conversion), List (for solving lists), User Function (if you need to add your own to TK!Solver's 34 built-in algebraic and trigonometric functions, from exponentiation to arc hyperbolic tangent), Table (for generating tables), Plot (for generating plots). This chart is a real boon for people who think visually—who like to see the broad context in which they're working at any given moment.

The instruction manual teaches you enough to run your software, and shows you how to build and use a model, moving around the different "sheets." Then you learn to solve the model you built. The model is called TRAVEL, and finds the length and cost of a trip by car. By the end of the instruction, you've worked through all the "sheets" on your chart. After that, a thick (and equally well-organized) reference manual helps you perfect your skills. One useful feature that's illustrated is windowing, where-

(continued on page 202)

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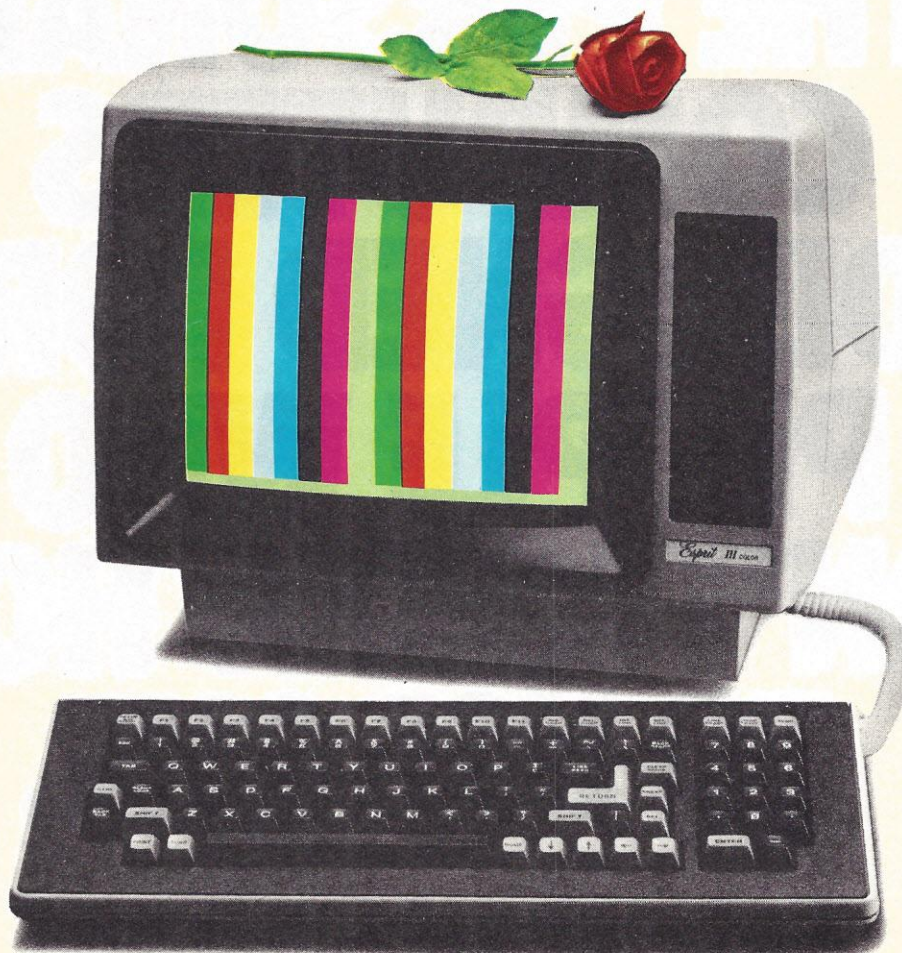
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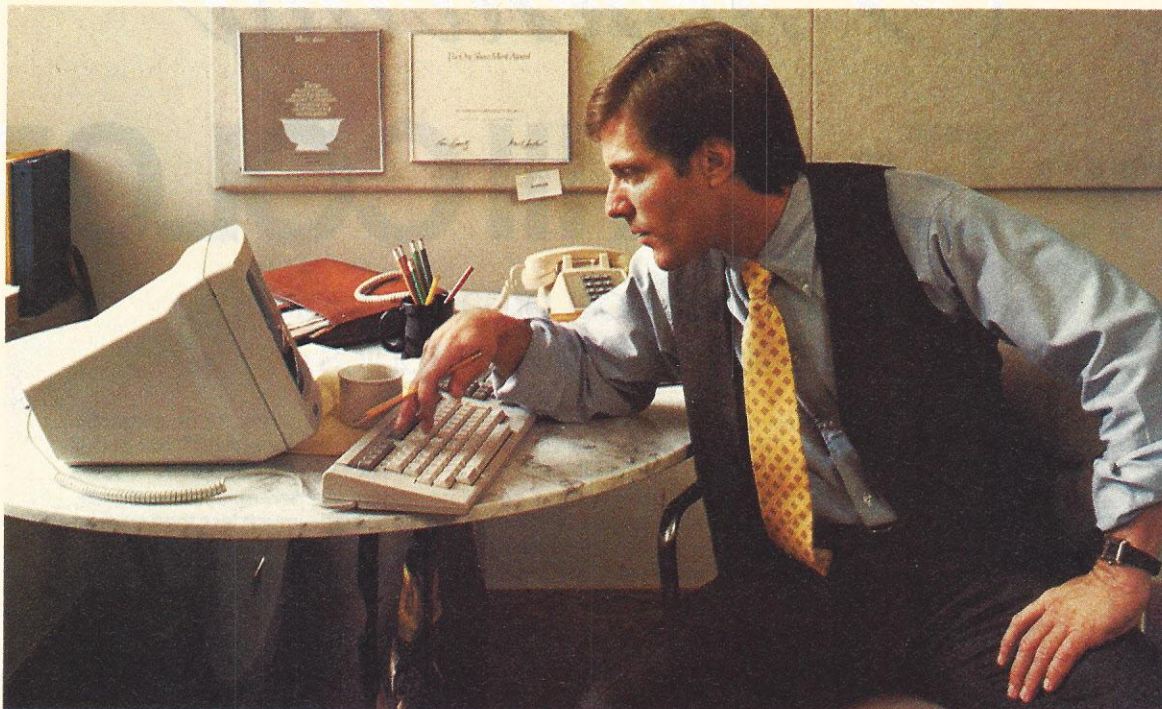
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CIRCLE 104

June 1983 PERSONAL COMPUTING 199



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Until now there were only two ways most people could learn to use a personal computer. Struggle through a manual. Or somehow push buttons until you get the hang of it. The first way could take several months. The second, several years.

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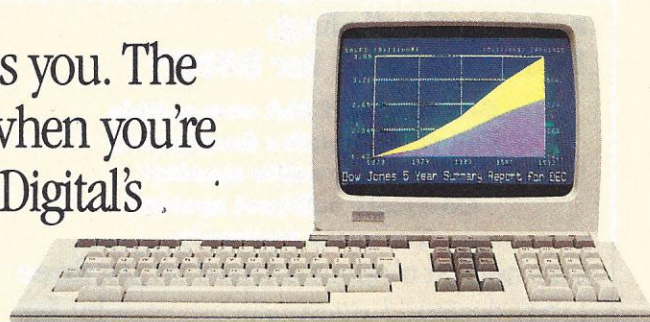
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1063
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CIRCLE 83

SOFTWARE OF THE MONTH

(continued from page 198)

by you can have any two sheets displayed at once.

Once you're familiar with TK!Solver, you should be able to move around the facets of a problem with ease, concentrating more on the problem itself and less on the processes required to get the answers you need. TK!Solver runs on a 96k IBM Personal Computer with one or two floppy disk drives (two are recommended). More memory—up to 256k—will enhance solving complex models. Eighty-column display is recommended. Also, Digital Equipment Corporation will be selling and supporting TK!Solver on the Rainbow 100 and Professional 350 computers. Software Arts says an Apple II version is planned, but no release data has been announced.

TK!Solver on the IBM costs \$299, including a backup copy of the copy-protected program diskette.

FOR MORE INFORMATION: SOFTWARE ARTS, INC., 27 Mica Lane, Wellesley, MA 02181; (617) 237-4000.

CIRCLE 284

—Lee Thé, Associate Editor

COMPREHENSIVE DISK-BASED TRAINING COURSES FOR APPLE IIe AND IBM PERSONAL COMPUTER

Looking for a good tutor for your new Apple IIe or IBM Personal Computer? Cdex's training courses for these two machines give you just that. These courses could be a real godsend for you if you want to learn to run applications programs on your computer with confidence. The fully interactive course has tests and exercises throughout. A lucid reference manual summarizes the main operating system and BASIC language commands you need, and is also a handy troubleshooting guide. Cdex's courses are designed to supplement and extend the manufacturer's documentation rather than replace it.

When we went through the Apple IIe course, the three diskettes and the manual's exercises took about 4½ hours to complete. The manual shows you how to put a diskette in a drive and boot the program, which starts up by asking your name. First you learn how to use the Cdex program itself. It's set up to let you pick and choose, but most people will opt to go straight through. The actual program starts with an overview of the IIe's main features, especially the keyboard functions. A few details were skipped—such as the fact that the IIe's two programmable function keys can also serve as game paddle buttons #0 and #1, or that the self-test feature will blow any program out of the computer's memory without having to shut off the machine, as is the case with many machines. But in most respects this Cdex course does a thorough job.

All displays are done in high-resolution graphics mode, with boldface, fully formed letters which are larger and more stylish than the standard Apple 40-column text

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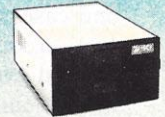
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SOFTWARE OF THE MONTH

mode. Images and text flow on and off the screen fairly quickly, so you rarely encounter delays. Both the manual and the displays reflect the professional design quality evident in previous Cdex software packages.

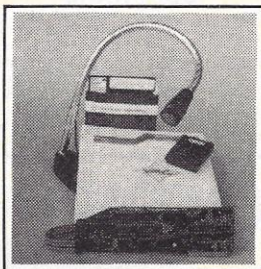
The first exercise is a good example of this high quality. If you guess incorrectly, you get a sort of warbling electronic sound from the machine, but it lets you try again several times. If you get it right, a synthetic fanfare toots sounds and the machine praises your new skills. In at least one case a half-correct answer was possible, and Cdex gave credit for it, while indicating that another answer worked even better. During all test segments you get a little menu at the bottom of the screen with several options. You can—at the touch of a key—skip all or part, go back and review something you didn't master, go back to the diskette's master menu, or exit the course altogether. In other words, you're in charge of the instruction, even when the program is testing you. Areas of learning where you could make disastrous mistakes are highlighted by a CAUTION display and a distinctive electronic sound

effect—and instructions on how to avoid that particular disaster.

After the introductory diskette you get into the meat of the course. Disk #2 teaches you the simpler DOS (Disk Operating System) and BASIC language commands you'll need to handle diskettes and run applications software. You also learn about the main display modes: text, low-resolution graphics, and high-resolution graphics. Then a graphics-illustrated tour takes you through the innards of the Apple and its disk drives.

Disk #3 has a few things to teach even experienced users who picked up their knowledge haphazardly. Here

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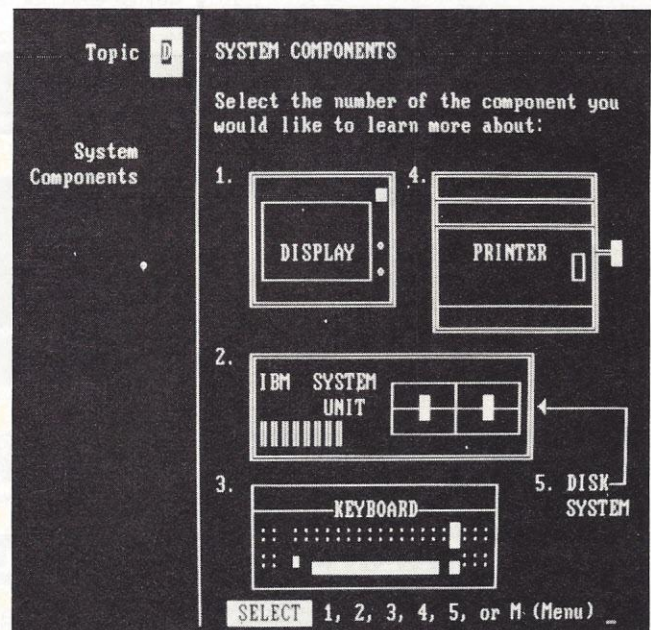
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CIRCLE 96



Cdex's training courses for the IBM Personal Computer and the Apple IIe are designed to supplement and extend the manufacturer's documentation in explaining the two systems.

you start by learning how to save, delete, name, rename, lock, unlock, and verify the integrity of disk files. You also find out how to do things like copy files from one disk to another, find out how much space is still open on the diskette, how to catalog a disk to find out what files are on it, and how to format disks to run on Apples with different amounts of RAM. These illustrate the wealth of practical detail the Cdex course offers. Periodically you're instructed to remove the Cdex disk and boot the DOS disk so you can practice what you've learned.

Finally, Cdex gives you an overview of popular operating systems, languages, and peripheral hardware available for the Apple. The course discusses the nature and uses of the favorite alternative operating system software for Apples: CP/M and UCSD Pascal. Languages

discussed include Pascal, Logo, Pilot, FORTRAN, and COBOL. You learn about extras like printers, Apple's 80-column card and extra RAM card (and added memory in general), modems, game controllers, and hard disks. This section helps enlarge the new owner's perspective about where he can go with computing. In each case you get a brief buyer's guide to help you know what to look for—and look out for—when you go shopping.

The course leaves you ready to boot your first applications program. This is as it should be—the system is the star, and the teacher provides the window for seeing it—in this case an extremely clear one. Since Cdex's first program was an equally lucid guide to using VisiCalc, we may be able to look forward to Cdex for good electronic tutoring on future products as well. Cdex training for the Apple IIe also runs on the Apple II Plus, by the way, and about 90 percent of the instruction applies to the older model.

Cdex for the IBM Personal Computer or Apple IIe costs \$59.95. The disks are copy protected, but come with a 90-day warranty against defects; thereafter, replacement disks cost \$10.

FOR MORE INFORMATION: CDEX CORPORATION, 5050 El Camino Real, Los Altos, CA 94022; (415) 964-7600.

CIRCLE 296

—Lee The', Associate Editor

SOFTWARE FOR A TYPESET LOOK

Even with the new ease and savings possible through the personal-computer connection to typesetting, there will be documents you write that are not quite important enough to justify the cost of having them printed. Yet you would like these documents to look "special," that is, have a typeset look. For these situations, there is a middle ground between standard word-processing output and printed documents. Some software packages, designed as aids to word-processing programs, let you achieve a typeset look using your personal computer and the printer hooked up to it.

One such package, ColorText from Jupiter Island Corporation of Emeryville, Calif., offers an alternative to printing for personal-computer users. When you use it in combination with any text editor or word-processing program, it gives you access to printing features for your document. Your computer must run under CP/M or IBM PC-DOS. This program was designed for use with a Prism 80 or 132 printer with a Process color ribbon, but will also work with a microPrism model or other non-color Prism models. The package lets you print in 22 colors.

ColorText lets you print in six type sizes, and has characters for six foreign languages. It can give you automatic centering, proportional and fixed character spacing, subscripts and superscripts, and reverse line spacing. It has a



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SOFTWARE OF THE MONTH

book text mode that prints in proportionally spaced type which is automatically justified at both margins. There are 53 commands that can be used in your text file for control of printout.

Jupiter Island does not pretend to compete with printers with this package. They admit that you have a greater range of typesets from a printer, and you will also get better quality characters if you get your text printed.

Another word-processing aid designed to produce a printed look is available from Lifeboat Associates in New York City. MagicPrint runs with CP/M-80 and SB-80-compatible word-processing programs such as WordStar, Magic Wand, PMATE, Mince, and Electric Pencil. It will work with daisywheel printers including the Diablo 1600 series, Xerox 1700 series, Xerox/Diablo 630s, and the Qume Sprint 5 and 9 series.

With MagicPrint, you can print with proportional spacing that is based on the actual width of characters. You have more than 50 formatting options. Overstrike, accent, special line settings, precision centering, pitch set-

tings that include kerning, and reverse leading are some of the choices you have with this program booted. You enter simple commands in the text of your file to change line length, page size, and other print features. There is no need to reformat every paragraph.

ColorText and MagicPrint are competitively priced. ColorText sells for \$149; MagicPrint is \$195.

There are other products on the market, software and printers, that aim at the middle ground between going to a typesetter and having your memo or letter printed in a standard way. While printing may be more desirable in most cases, these products offer you an alternative to typesetting in those cases where printing a document is neither appropriate nor cost effective.

FOR MORE INFORMATION: ColorText—JUPITER ISLAND CORPORATION, 1900 Powell St., Emeryville, CA 94608 (415) 655-0840. CIRCLE 449

MagicPrint—LIFEBOAT ASSOCIATES, 1651 3rd Ave., New York, NY 10028; (212) 860-0300.

CIRCLE 451

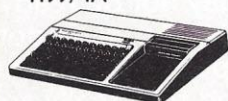


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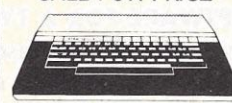
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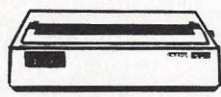
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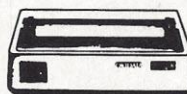
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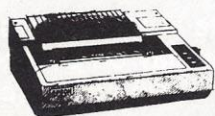
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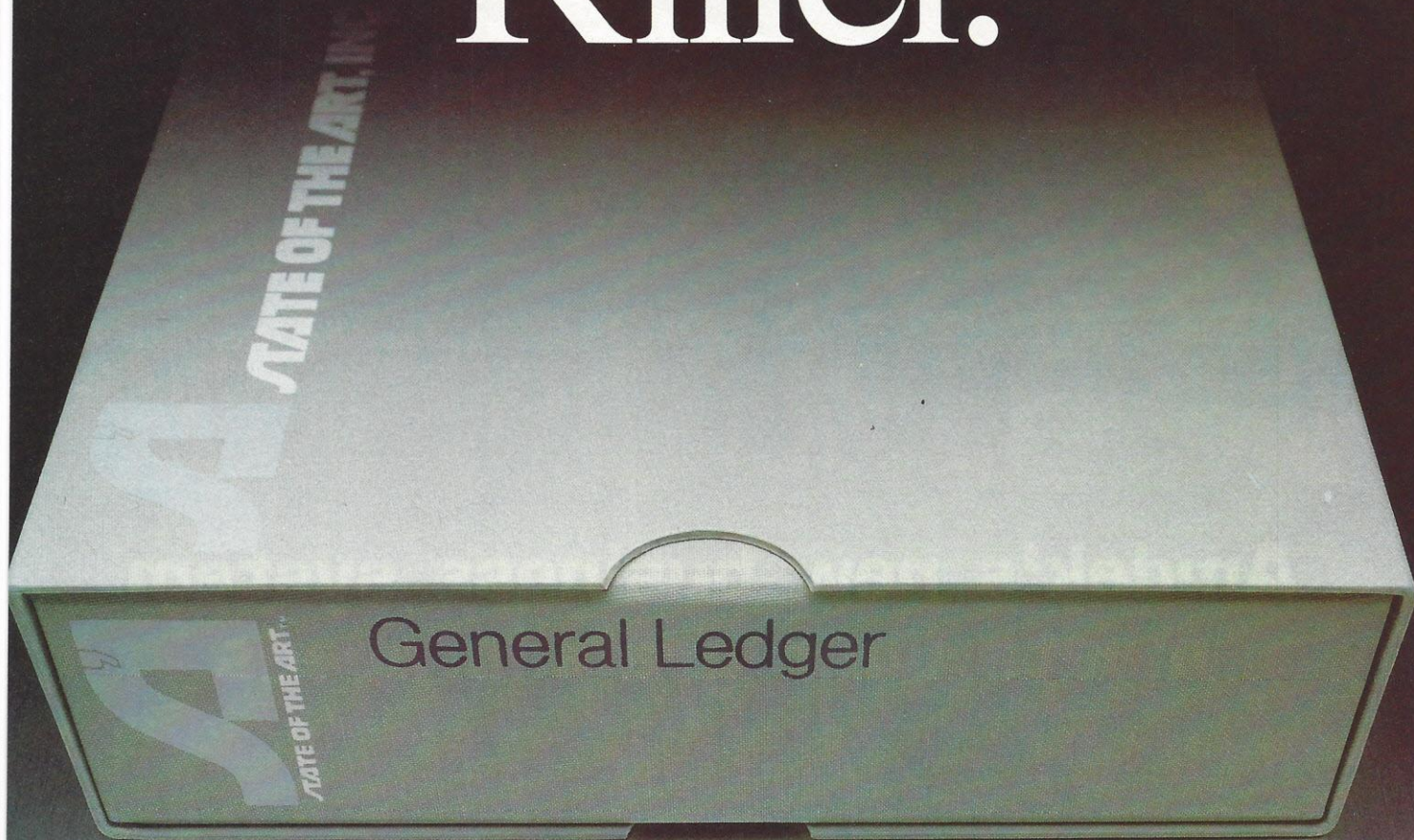
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CIRCLE 98

COMING IN FUTURE ISSUES

Advanced Word Processing

Some people need more than a simple word-processing program. WordStar has word-processing ancillary programs that let users do indexes, footnotes, bibliographies, and other advanced word-processing functions. Read about the uses of WordStar in the July issue of *Personal Computing*.

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AD387

BUSINESS

BETTER PROJECT MANAGEMENT

(continued from page 95)

say, 'OK, we have to be ready in June of 1985 and we have all these tasks to complete,' and from there I allocate time slices. I can look at the effects of the allocations and the dependency of each task to determine whether or not we can actually make that date. I can also determine how many people I would need.

"If the ground rules change," he continues, "if one critical component is to have a function completed by such and such a date and there are five, or six, or seven functions beyond that are all interrelated, without this type of a tool you would have to sit down and lay it out on a piece of paper to figure out what the ramifications of that one change are going to be. With this kind of productivity tool on a personal computer, you can make your assumption change and the new schedule will come out."

Mongelluzzo also finds computerized critical path analysis an effective tool for presenting project plans to upper management. He can take his schedule into a planning meeting and if someone asks, "What happens if this part slips?" he can make a few minor adjustments and answer the question.

How much, and when?

"If it's a minor project, it's not too difficult to see exactly what is going to happen," he says. "But when you get into a project that has 50 or 60 interdependent tasks, a short-term project that spans a period of, say, a year, it gets very difficult to make changes on a piece of paper."

But pieces of paper are actually what management sees when you present a project schedule. And MicroGantt produces three kinds of reports that are graphic representations of the scale of the project. One report deals with the project in terms of how long certain tasks take, which tasks must precede others—in es-

sence, the critical path. The second report presents a work summary in terms of how many work hours must be put in and how many have already been put in. The third report is a financial summary which gives the user a cost breakdown of man-hours and materials. According to Westico, these reports provide users with answers to questions they need answered at the outset—how much is it going to cost and when is it going to get done?

Playing the "what-if" game

"To do the what-if kind of stuff is really where it's at," says Mongelluzzo. "When you are looking at a strategic planning aspect of a project trying to draw up a financial plan for a new service or a new idea and you start planning over years, it's very easy to go back and say, 'OK, where do we break even? If we do this at this point in time, what happens?' If you sit down and try to do that on a piece of paper you could make a bad decision because you made an error four pages back that you've carried forward."

Mongelluzzo, like Grigore, used to figure these things out on pieces of paper, taking a Saturday at home once a month to plan or update a project. Now he does most of his planning on his Advantage and it doesn't take as long. "Now I update once a week and I don't dread it," he says. "In fact, I enjoy looking at it and saying, 'I picked up some time here. What else can I squeeze in?'"

Both Mongelluzzo and Grigore have found that using a personal computer to do critical path analysis has made them more productive. They can make sure their projects are "launched" on time—although they may not be on the same scale as NASA's space shuttle. As Mongelluzzo says, "Once you start you just can't go back. It's the best tool I have. Take away my pad and my pencil, but leave me my personal computer."



GEMS OF WISDOM

Finding The Home Key Positions

When an experienced touch-typist starts using a personal computer, he will have to learn to return his hands to the correct "home key" positions after using keys such as CONTROL, DELETE, or ESCAPE, or after using two fingers of one hand to type certain keyboard commands. If his office has more than one brand of personal computer, it adds to the confusion as he moves from one keyboard to another.

I have been touch-typing all my life, but when I started using computer keyboards, I found myself looking at my fingers after reaching for those extra keys to make sure my hands were back in the correct position.

I solved this annoying problem with a dab of five-minute epoxy glue. I spread a small amount of epoxy on a piece of paper with a toothpick, then waited for about three-quarters of the curing time specified on the package. Just as the epoxy started to thicken, I picked up two small beads of it (about a quarter of the size of a grain of rice) and fixed them on the "D" and "K" keys. (The beads should be thick enough to support themselves. If they spread flat, you've applied them too soon.)

To accentuate the texture of the tips, I pricked up the centers of the epoxy beads with a toothpick as they were setting. After a few tries I got just the right amount of peak for my liking.

I liked the results of this experiment so much that I fixed two more keys—3 and 8 in the numeric row. This eliminated the need to look at the numbers I was typing.

The epoxy adheres well, but is easily removed by pushing a wooden stick sideways on the epoxy so as not to scratch the keys.

John Paek
DEKALB, IL

This Gem of Wisdom wins \$25 for John Paek. If you have an anecdote, tip, or secret to share, send it (up to 250 words) to Gems of Wisdom Editor, Personal Computing, 50 Essex St., Rochelle Park, N.J. 07662.

Solving The Paper Problem

We had just purchased a Kaypro II and a Gemini 10 printer when, after doing some word processing and "Calcs" to familiarize ourselves with the system, we ran out of printer paper. Since we live in a small town about an hour's drive from the city, we couldn't renew our supply for a few days.

We had an old 20- by 34-inch newsprint note pad, the kind used for charts, children's watercolors, etc. By cutting the pad into 8½-inch wide strips, and using the printer's friction-feed option, we were able to meet our immediate needs.

John and Paula Lincoln
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Correcting Disk Sectors

Have you ever tried to format a disk and discovered it wouldn't format because of bad sectors? If so you would normally throw out the disk and try another one. But there is a better solution.

Instead of discarding the disk, remove it from its envelope and carefully pass a magnet over the disk surface from one side to the other until the whole disk has been covered. This will restore the disk 99 times out of 100. I don't know why it works, but it does.

This can also be used on previously written disks, but you'll have to make backup copies of your files in order to protect your data.

Thomas V. Murphy
MURRAY HILL, NJ

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INTERVIEW
(continued from page 53)

Your change in personal style brings up a fascinating question. How common is that type of shift in personal style as a result of having access to personal computers? Do you suppose people may think through problems more astutely as a result of having that power at their fingertips?

Dehn: Certainly anyone who has discovered the power of personal computing as an adult is going to have an old way of doing things and will discover a new and better way.


The more I deal with personal computing, the more the computer becomes an extension of my own mind. I am far more creative and productive than I could be without it.

A computer is really an amplifier of a person. With it you can take whatever you do and do even more—which enhances the kinds of problems you can attack and solve. And if you're programming, the act of debugging may change the way that you think about solving problems.

Some people are apparently marketing AI programs that would be suitable for use on personal computers. What would these programs do that regular programs don't do?

Dehn: Here there's a question of what counts as a genuine AI program. Many of the "AI" programs available for personal computers today are old hacks people have played with and may have stripped down to fit into the memory capacity of a personal com-

puter. I do believe that personal computers will have genuine AI programs at some point because personal computers are getting bigger and bigger. But right now there aren't any really useful AI programs in this category.

Personally, I think AI has been getting too much coverage in the popular press recently. There's been too much hype for the current level of maturity. What's happening is that publicity about AI has been pressuring people to try to package their research into practical programs before it's really ready. As a researcher, I think AI is perhaps the most exciting field to be in right now. But there is a long way to go before these research results can be translated into practical systems. 

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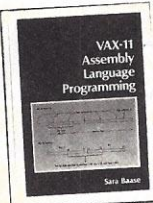
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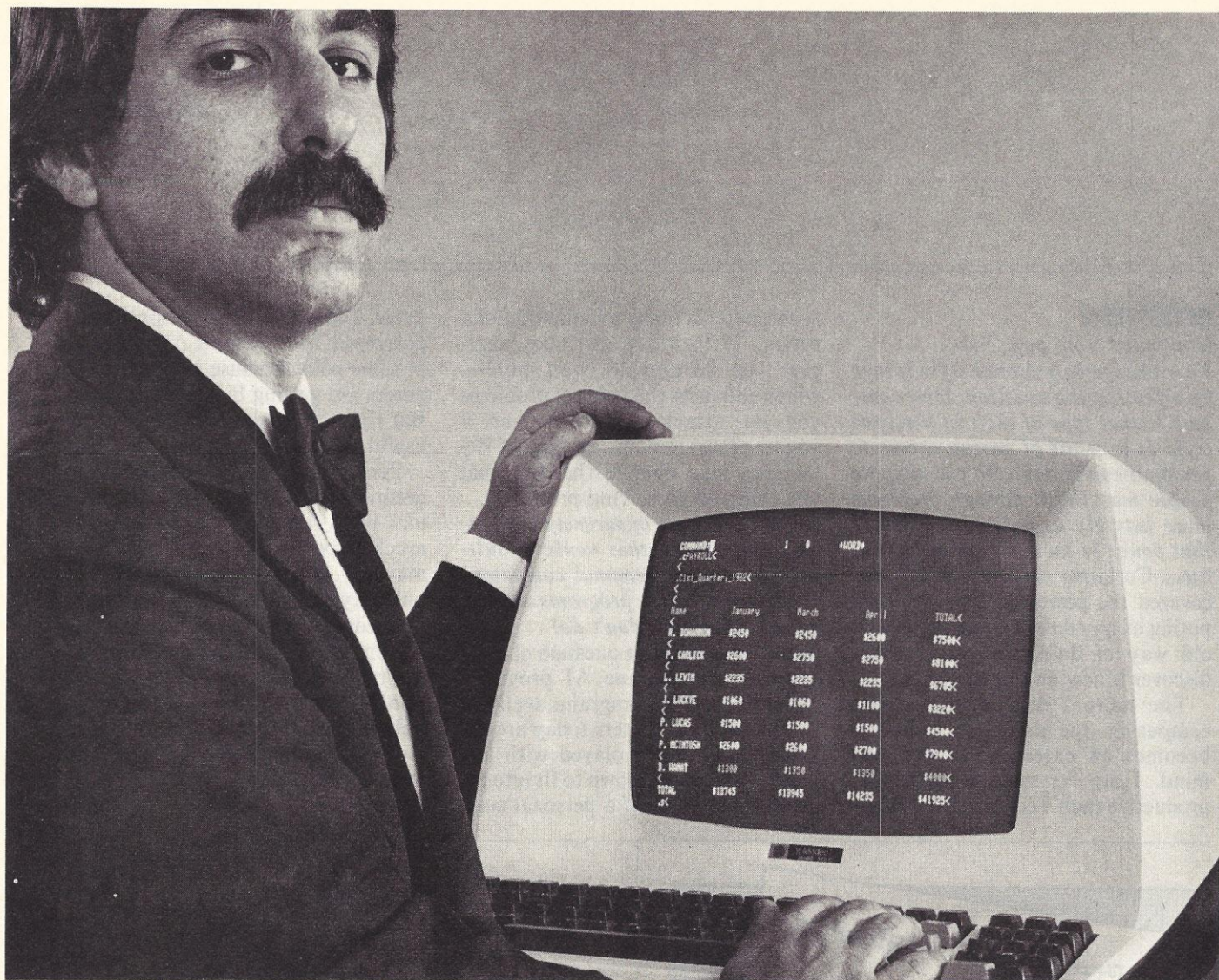
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CIRCLE 93

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Computer Choreographs Dance Steps

Eddie Dombrower sits at his Apple II Plus personal computer, and watches calmly as a "human" leg flies across the screen. He doesn't even flinch. He knows this graphic manifestation means he's that much closer to perfecting a software program which could make life a lot easier for dancers and choreographers.

It's all part of DOM Notation, which stands for Dance on Microcomputers, a program Dombrower has developed to help people learn dance steps by watching human shape figures pirouette across the screen. "It's an animated version of the dance," Dombrower says. "It's the first choreography notational system oriented toward dancers instead of notators."

The 26-year-old Dombrower, who designs video games for Mattel Electronics in Hawthorne, Calif., knows what he's talking about. A dance enthusiast himself who has choreographed and performed both professionally and as an amateur for the last six years, he has firsthand knowledge of the problems of current choreography notational systems.

"I got into this because I was very frustrated that there was no notational system of any worth," he says. "There's the old-school method, where a studio keeps an old ballet dancer around who makes a living by remembering dances." But relying on human memory and communication, Dombrower says, often results in a dance whose finer points have been somewhat distorted—not to mention the plight of small, out-of-the-way dance companies where no one's available to teach major works.

A different set of problems comes from using the Labanotation, a popular notational system which uses

symbols like triangles and squares to represent body positions, making the dance steps tricky to decode. "It's like reading music," says Dombrower, "only much more complicated. It takes years to learn to do it properly. You have to hire someone to notate a dance, and if the choreographer can't read it, he has no way of knowing whether it's an accurate representation of his dance."

So Dombrower decided to find a better way. He got a Thomas Watson Fellowship in 1980 to work on an in-

Labanotation's complex system.

"It was too futuristic for the average, dusty little dance studio," he says. "I wanted to orient it to users. I wanted people to see a dancer, to know what the dance is supposed to look like."

Using his Apple II Plus, Dombrower began his animation experiments with a hand—trying to make it look and move like a human hand "just to decipher why there was so much trouble with that."

That problem, which took two



Eddie Dombrower's Apple II Plus and the DOM Notation help people to learn dance steps by watching human shaped figures pirouetting across the screen.

dependent project abroad for a year, and headed for England to research the existing computerized dance notation. Exhausting the store of information in no time ("I read all eight articles ever written on the subject!"), Dombrower was disappointed by what he saw. The only existing computerized choreography was based on

months to solve, challenged him to press on. "I went about establishing that a human being could be recognized on an Apple," Dombrower says. "I came up with the notation system itself backwards—it developed as a tool for moving the figures around. I wanted to make sure I could get the figures to keep their shapes."

HICKORY HILL COMPANY

END DATE: 25 FEB 1987
STATEMENT AS OF: 25 FEB 1987

| CATEGORY | PLAN | ACTUAL |
|----------------|--------|--------|
| SALES | 40,000 | 51,000 |
| COST OF GOODS | 25,000 | 23,000 |
| NET SALES | 15,000 | 11,000 |
| ADMINISTRATION | 4,000 | 4,000 |
| ADVERTISING | 2,000 | 4,000 |
| RESEARCH | 17,000 | 15,000 |
| TOTAL COSTS | | |

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Dombrower says he uses "the minimal setup" of computer equipment for his work. His Apple computer has the standard 48k storage with an additional 16k RAM board inserted in one of the seven expansion slots, though he says the program will work just as well without the extra 16k. He uses one disk drive and the standard Apple DOS. The program does require one non-standard piece of equipment—a printed circuit board specially built for the system by Dombrower's partner, Mike Lopez. "We use the board to help speed up the graphics in the program," Dombrower says.

Users of the program have the options of seeing the animated dancer move at regular speed, slow motion, or freeze frame, and can even do a walk-around on the figure, seeing it from all angles. Each disk stores 15 to 45 minutes of one dancer's movement, and rewind time is only five to 10 seconds because the information is stored on disk rather than tape.

Dombrower has taken special care to make his program easy to use. "I'm trying to cater to the 'technophobe' as much as I can," he says. "Ninety percent of the users will be dancers. The more things you can remind them of on the screen, the more comfortable they'll feel. If users want to change the position of the arms, joint by joint, they can look at the dancer on the screen—they don't need to remember which numbers on the keyboard correspond to which body positions. They can just try it and then immediately see if it's what they want. It's faster than trying to look it up."

The program is nearly complete; Dombrower's just cleaning up a few details before preparing to market it. "Occasionally a limb will fly off if I change something major, or I'll get a leg lying in the middle of the screen."

But he expects to iron out these problems very soon, and the package should be ready for the public eye before long. Dombrower and Lopez

have formed a company, Mirage Graphics, to sell and possibly lease the notation system to people who want to choreograph and save their own dances. Down the road they hope to expand into selling and perhaps leasing the notation system of previously choreographed works, in much the same way as movies are rented out for use on home video recorders. They would also like to make available vocabulary disks, which would name and demonstrate dance steps from all different styles of dance.

The program's most likely customers will be dance companies that can use the system to teach entire dances when a teacher is not available. "Say a dancer hurts his foot and someone else has to learn that part in a hurry. This would help him learn his part by himself and keep him from taking up the time of everyone else in the company," Dombrower says.

Like any new method of doing things, Dombrower's program has its detractors as well as its supporters. Proponents of old-school choreographic methods have accused him of reinventing the wheel. "I don't consider that old wheel to be rolling," counters Dombrower. "I think it's pretty square."

In Control Of Your Own Domain

There aren't many people who can telephone an empty house, tell it to turn the stove off and get results. But Allan Ginsberg, a businessman from Bethesda, Md., can. Ginsberg is a computer hobbyist, a self-confessed "gadget freak" who experiments with personal computers the way Julia Child plays with a new food processor.

"All you have to do is let your imagination go," he says, "and you'd be amazed at what you can get your computer to do."

Ginsberg has rigged up his computer to nearly everything in his home. The coffee pot presents him with hot brew in the morning; the Jacuzzi starts heating up for him at 6 p.m. each evening; the lights, air conditioning, oven, stove, toaster, and sprinklers—all of them are programmed to switch on and off at predetermined times.

"I just think it's neat to be able to lie in bed and control my house, to be able to sit there and turn the lights off from bed," he says. "I'm in control of my domain, as opposed to my domain being in control of me. My house reacts to my needs."

The idea of a computerized home first caught Ginsberg's imagination about five years ago. "I saw a movie where an entire home was run by computers." His purchase of an Apple computer soon followed, and now he has three personal computers to take care of his needs: an IBM Personal Computer with two disk drives which he uses for financial programs, word processing and filing; a 64k Apple IIe with one disk drive ("It's the best computer to go with when you're playing," he says); and a specialized, very small personal computer with only 2k of memory and no disk drives. It's this unit which runs his computerized home system and, the minuscule memory, he says, is quite adequate for the task.

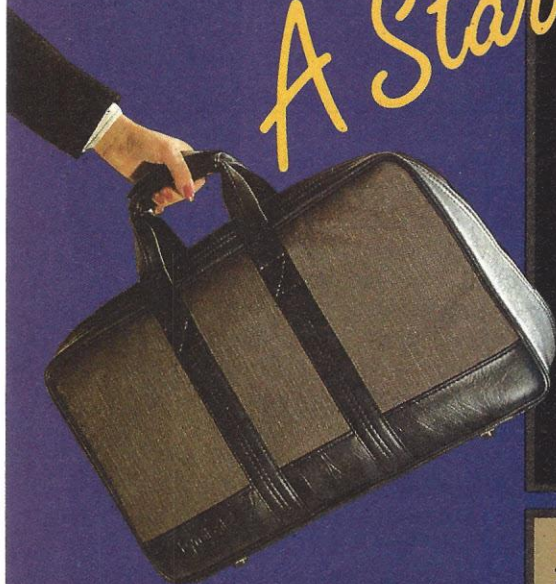
"For a computer, controlling your house is not a very complicated function," Ginsberg says. "It only has to turn a switch on and off. Why would I need a tank to do the job of a motorcycle?"

Ginsberg says it's relatively simple to set up a system like his. "I do not know how to program my computer. Everything I do, I buy off the shelf and just put it together myself." His equipment includes the BSR Home Control System (which can be hooked up to an Apple personal computer) and appliance modules which plug into ordinary electrical outlets.

Ginsberg's system is controlled by

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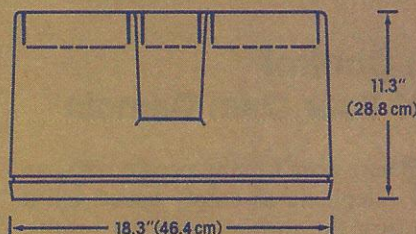
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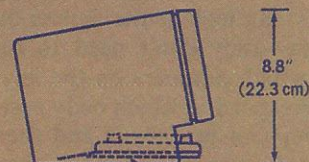
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a small remote control box which he keeps by his bed. Pressing a button in that box sends a digital command through the wiring of the house, causing appliances to turn off.

A timer module enables Ginsberg to program when appliances will turn on or off by themselves. He also uses his telephone interface to call and tell the house what to do.

The system would work without a personal computer, Ginsberg says, but it would be limited to switching electrical power off and on. With his present setup, Ginsberg can also keep track of the amount of energy he uses—how much wattage, for example, per appliance, per room, per month.

Ginsberg has incorporated temperature, sound, and light probes into the system, making it more sophisticated and allowing him some exciting new options. Software, in conjunction with moisture sensors in the lawn, tell the sprinkler system when it's time to water. Adding light sensors has allowed Ginsberg to program the computer so it can tell the drapes when to open and close. And sensors on doors and windows function as a security device by alerting the computer when they're touched.

When he has a party, Ginsberg preprograms the lights to "control the mood," he says. He has them gradually dim throughout the evening and then, at a designated time, they slowly come up again. "You don't have to run around telling people, 'It's getting late now, time to leave,'" he says. "You can program your environment."

"For me, it's intriguing," Ginsberg says. "I'm challenged by the concept of seeing how you can do things. I want to be able to sit down and say, 'Do this,' and it will do it." He and a friend are now experimenting with a system which will respond to vocal commands.

Ginsberg also uses his personal computers to help him do his income taxes. He says his financial program saves him "thousands" by keeping

track of his deductions. "You'd be amazed at how much people don't deduct because they forget about it."

After 22 years in broadcasting, most recently as vice president of TV station WTTG in the Washington, D.C. area, Ginsberg is striking out on his own to become a business consultant. He says he's likely to use the experience he gained from computerizing his own home to help others set up systems.

Managing Airline Reservations More Efficiently

The mainstay of any successful airline is an efficient passenger reservation system. Most major airlines keep track of schedules, reservations, and flight records through complicated mainframe computer systems accessed through the familiar terminals located at airports or travel agencies. These systems are expensive and take a great deal of time to set up, so the prospect of implementing them on a small scale is practically impossible.

At American International Airways (AIA), managers have overcome this obstacle in a novel way. They've devised a new system, using personal computers, which gives them all the benefits of a mainframe airline reservation system at a fraction of the cost.

AIA, based at Pomona, N.J., was formed two years ago and currently employs about 300 people. The company's five DC-9s fly to major cities on the East Coast, averaging 20 flights per day. "As a new company, we're looking for ways to do things economically," says company vice president Dick Hankins, who developed the airline's new reservations system.

"We handle about 20,000 reservations a month," says Hankins, "and keeping track of thousands of records manually was virtually impossible." Hankins, who has a 30-year background in airline operations, is an expert in mainframe computer booking systems. He realized AIA needed such a system badly if it were to cope with growth successfully. But he also realized that the costs of implementing a mainframe system were

(continued on page 223)



American International Airways' booking operation consists of approximately 20 Apple II Plus personal computers linked to a Corvus Omninet hard-disk system.

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(continued from page 219)

beyond the small company's budget, and would be for a long time.

Hankins is a confessed personal-computer fan. He's had an Apple computer at home for three years, and one of his personal challenges was to determine whether or not he could put an airline reservations system on a personal-computer network.

One day he showed a copy of his experimental program to AIA's chairman, explaining that the system had never been tested, but that in Hankins's view, there was no reason why it shouldn't work. "He said to give it a try," says Hankins. Thirty days later, the system was up and running, and the company has never looked back.

AIA's booking operation consists of some 20 Apple II Plus personal computers linked to a Corvus Omninet hard-disk system. The 30 employees in the booking department use the system to make reservations, update schedules, draw up passenger lists, maintain inventories, and check flight availability. Response time of the network equals that of a mainframe system—it now takes two to three minutes to take a reservation by phone, compared to the six to nine minutes it used to take to do the work by hand.

The system has been in operation since December, and has never been down. (One advantage of networks is that if one computer goes down, it has no effect on the rest of the network.) "Within two months of installation, the system had more than paid for itself," says Hankins.

Capital outlay for the hardware was under \$500, considerably less than the \$20,000 monthly required to piggyback a mainframe operation. Hankins says the way in which the system is operated is "almost identical" to mainframe operation, a feature which minimized the expenditures usually required to retrain operators on a new system.

Although the cost-efficiency of the

system is the most obvious advantage, Hankins has also found a flexibility in the personal computer network that's absent from mainframe operations. "It's much more forgiving than the mainframe. Changes to the program can be made quickly and with a minimum of difficulty," he says. "The system is constantly changing. If we determine a need today, we can meet it tomorrow. With a mainframe system, someone else is doing the work and you have no input as to what the system is capable of. But when it's your own system, you can make it do whatever you want it to."

Plans for expansion include installing personal computers at various airports and linking them to the airline's headquarters. Hankins also intends to hook up with the industry communications network, which would provide AIA with information on airports and weather conditions around the world.

Hankins admits there are limits to the system AIA is using. It couldn't, for example, handle 1000 reservations a day, which is what many major airlines have to deal with. And storage capacity of the system is already reaching saturation for the growing company. Hankins plans to switch the system over to more powerful personal computers with larger memories. But for the moment, he's very pleased. "Based on our planned growth, the system will carry us into the future."

Perfecting Software Programs

Ploddling through page after page of computer manuals isn't high on Lucy Smith's list of her all-time favorite things to do. "People don't like to read instructions," she says with assurance. "I don't like to take half an hour to read this manual and figure out how to start using the pro-

gram. I want to get in there and start playing."

Smith works as a senior tester for International Bureau of Software Test in Sunnyvale, Calif., an independent laboratory which tests software in much the same way programs are tested in-house, but with the guarantee of impartiality.

As a software tester who works from her home on various personal computers, Smith has the freedom to ignore the manual and "start playing." She also has the freedom to enter the wrong information, or to purposely follow instructions in the wrong order. In fact, she has permission to do absolutely every devious little thing to a program that she can dream up—all in the name of perfecting it before it reaches the marketplace.

"What I do is try to break it. I guess that's why it's fun. I test programs like the kids play games—what can I do to it this time? If it says it can handle 500 files, I try to put in 501." She rubs her hands together. Lucy Smith, computer veteran of more than 20 years, knows that the better, more thorough job she does of testing a program now, the better the final product will be.

"It takes a lot of concentration," Smith admits. At times she says she gets stir crazy and that's when she walks away for a while to take a break. "And then you get another diabolical idea," she laughs. She clearly enjoys her work, treating it as a puzzle which it is her mission to solve. "There are a lot of people who don't like testing at all," Smith says. "The ones who last at it are the ones who approach it as a game."

"If the same person who writes the program also tests it," says William Pabst, another senior tester for the company who works from home, "he's not testing what you and I are going to do when we get the thing. The guy knows what to type there!"

Lucy Smith agrees. "The programmer knows what the input ought

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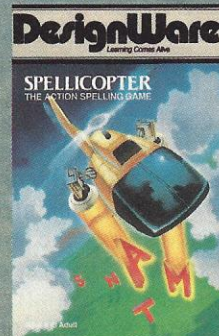
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to be. He sometimes makes assumptions that input will be typed in a certain form. There are a lot of ways to type in the date," she points out.

Smith performs her testing in her living room, putting all sorts of personal-computer programs through their paces on her family's abundant equipment. She, her computer-loving husband, and two sons own a 320k IBM Personal Computer with two disk drives, an Epson MX printer, an Amdek Color II monitor to aid in testing the color on graphics programs and video games, an Apple II Plus with two disk drives and 64k of memory, an Apple III monitor, and a CP/M machine with two 8-inch disk drives. The family also has a letter-quality printer made from a rebuilt IBM typewriter.

Making intentional mistakes to see how the computer will respond is just one of the important aspects in testing software. The tester must also go through the manual step by step, instruction by instruction, to detect any inconsistencies between what the manual says the computer will do and what actually happens when the program is used. And, perhaps even more challenging, the computer-weary tester must go back in time and remember how it felt to be a novice, looking at that keyboard and manual with fresh and often confused eyes.

"I think my expertise is not a hindrance, it's actually a help," says Pabst, who has a master's degree in computer science. "I ask myself, 'What could this program do if it were designed correctly?' And I can still spot the problems for a novice. After all, it's a brand new program to me, too."

Detecting bugs in the program is only the first step. "Then comes the hard part," Smith says. "You tell the programmer in a report exactly what's wrong." Once the programmer has corrected the problems, he sends the software back to the tester.

This cycle repeats until the program is perfected. "It's usually a three- to six-level process," she says. "It could take months because the programmer fixes mistakes, and more mistakes come up. Then the writer has to update the manual."

Through all these revisions, isn't a tester tempted to slack off on testing a program she has already tested four or five times? "No," Smith exclaims. "By that time, you want the program to be so good. That's where the emotional part comes in."

To be a good tester, Pabst believes, you need a combination of "anticipation of what problems could exist, and probably a second sense." He does his personal-computer software testing from home on a 256k IBM Personal Computer with two disk drives, and on various other computers he has hooked together himself. "I really enjoy working at home. The flexibility is the main thing, being in total control of my time. I'm doing exactly what I want to do."

From a consumer's standpoint, Pabst says his experiences in testing software have made him more critical of programs he is considering buying. "It really opens my eyes," he says. "I know what to expect from a good program." He suggests people "look at every package possible, and get demonstrations from educated users. Novices should definitely do their homework and be sure they know what they're buying."

An Innovative Amenity For The Business Traveler

Thirty years ago the hotel industry astonished travelers with an innovative luxury—televisions in every room. Now one company is going a step further by installing computer terminals in hotel rooms, enabling business travelers to stay in touch

with the office while they're on the road.

Dallas-based Travelhost, Inc. has developed the first two-way computer communications system for hotel rooms. The company calls it "the ultimate in hotel amenities."

By pressing a few keys on the terminal in his hotel room, the business traveler can now access a sophisticated communications system. "It converts what has been a bedroom into a communications center," says Travelhost president Lee Smith. "For example, through the message button we have created an office away from home—a 24-hour office, in fact."


For the business traveler to make use of this system, his company must, of course, be set up to communicate. "We provide the opportunity for a company to hook up with our network," says Smith. "At most, this means some minor software development." Smith believes the system can provide a real time saving, as well as increased efficiency for the businessman and his company. "The message button gets you into an electronic mail system," Smith continues. "Any software that's available through electronic mail is available here."

In April the Midland Hotel in downtown Chicago's Loop area became the first hotel to have Travelhost operational terminals installed. The Midland was approached by Travelhost because of its location and its clientele. "We've done other front-line things here," says Myron Levy, Midland's general manager, "and I guess that's why Travelhost approached us—that and our location."

What prompted the established Midland Hotel to become an innovator? "It's because of our special interest in the business traveler," says Levy. "We feel we're bringing tomorrow's technology to today's traveler. We have always been committed to filling the needs of the business traveler by providing a key to immediate,

(continued on page 229)



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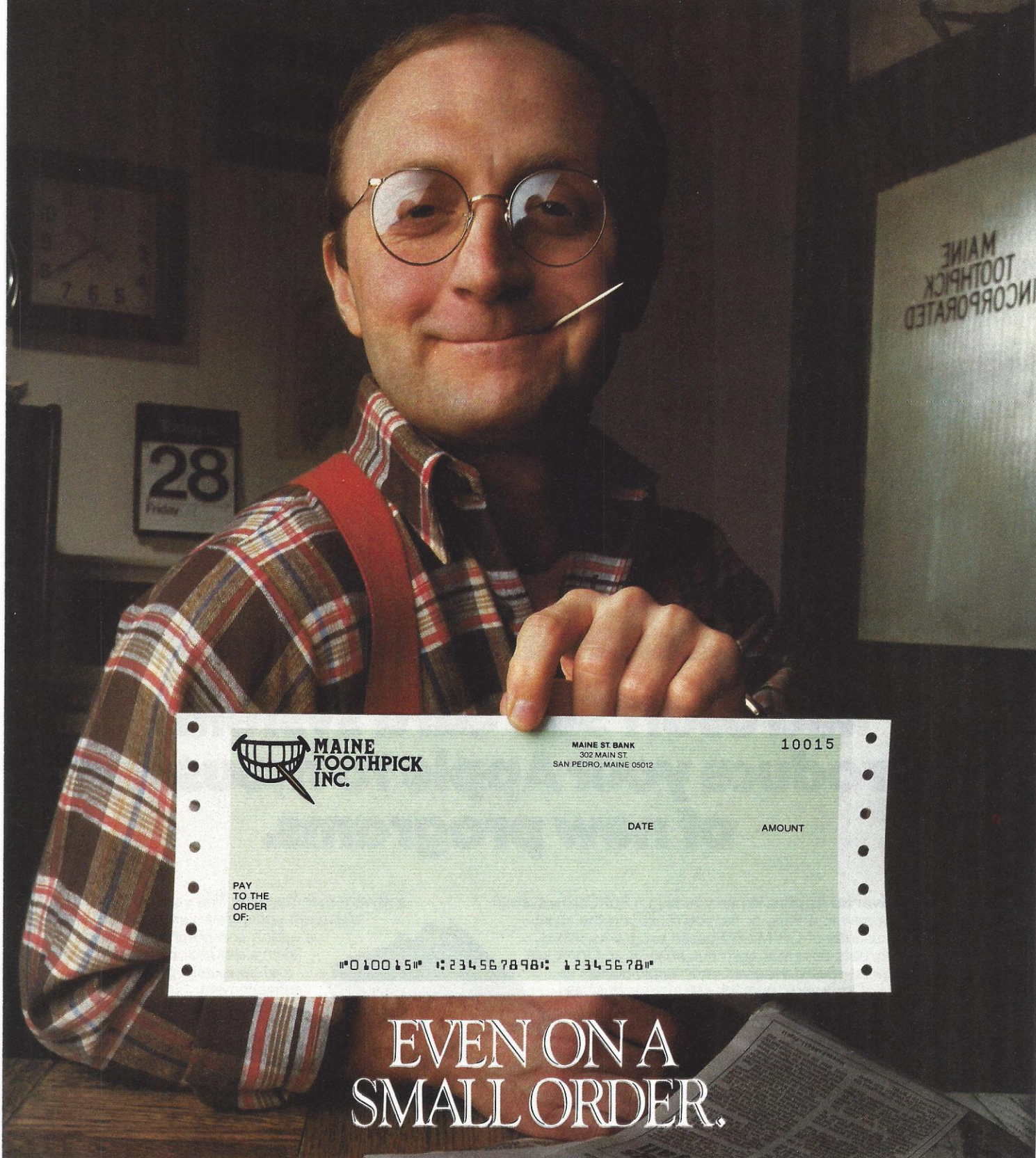
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(continued from page 225)

necessary information. We give the businessman the *Wall Street Journal*, not French-milled soap. We don't have a swimming pool, but we can give people tools they can use."

Interest in the Midland Hotel's new installation has been great, says Levy. "People are calling us because they've heard about it. And it's not just curiosity—it's real enthusiasm and support for this innovation."

Business travelers aren't the only ones who can profit from the in-room Travelhost terminals. Contracts have been signed with major hotel chains, as well as with leading independent hotels across the country. A world of information will be available to the hotel guest in the privacy of his hotel room.

"By simply pressing a button you can get to some vital services, as well as leisure activities like games," says Smith. The user can access stock information and a news service, check airline schedules, and even make connections with a travel agency. Travel

information including sightseeing tours and places of interest in particular cities will be available, too.

Shopping via the in-room computer terminal is now on the drawing board. When it's in place the user will be able to select items from a catalog of merchandise. "The guest will just punch in the catalog order number and his credit card number," explains Smith. "It's actually like a central ordering service, with carefully selected ordering sources."

The introduction of computers in hotel rooms is a super opportunity for the hotel, says Smith. Guests are charged for the service in the same way as they're billed for long-distance phone calls, based on minutes of use with a minimum use requirement. The hotel shares the profit with Travelhost.

"This [computer terminals in rooms] is a very bold concept," says Smith. "But it's an opportunity that we think will be of great service to both the hotelier and the business traveler."

Word Processor Provides Powerful Pizzazz For Politician

San Francisco Supervisor Richard Hongisto is involved in so many different political, professional, business, and social activities you would think he either has a large staff or he puts in an 80-hour work week. Neither is true. "To keep up with all my projects without help would cause the quality of each to suffer," he says. The help Hongisto relies on is his Apple II personal computer and WordStar, a word-processing program from MicroSoft in Bellevue, Wash.

Hongisto has discovered uses for his program that put to shame the description of a word processor as simply a text editor. For example, using a word processor to thank political contributors "personally" is certainly not unique. But Hongisto goes a step further. Whenever one of his constituents writes to him on a particular issue—say the quality of the municipal railroad or zoning of high-density multifamily housing in residential areas—he enters the constituent's name in a file in his word-processing program and codes it with the issue, or issues, the person is interested in. Later, if that same constituent makes a contribution, Hongisto and his computer will automatically write a thank-you note with paragraphs describing the work Hongisto has done on that specific issue.

Hongisto uses the same system when he wants to mobilize voters around a particular concern. He uses his Apple II and WordStar to write letters only to people he is certain will be interested in and sympathetic to his cause.

At present, only those voters who write letters to Hongisto have their names entered and encoded with the issues they are concerned about. But he's planning to buy a second com-

(continued on page 233)



By pressing a few keys on a computer terminal in his hotel room, the business traveler can now access a sophisticated communications terminal.

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the complexity and costs of typical modems, and producing instead modems elegantly simple in execution with absolutely state-of-the-art reliability and features.

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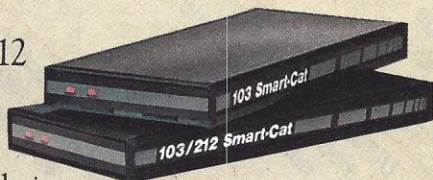
Tucked inside every Cat package, you'll now see a special "get acquainted" subscription to **The SourceSM**. You might as well get started right.

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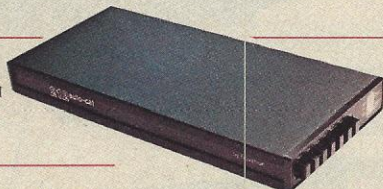
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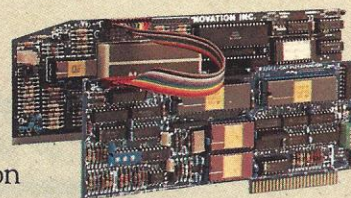
212 AUTO-CAT™ MODEM



You get all the options of a full duplex Bell 212A compatible modem and more. It's an advanced modem with custom microprocessors and LSI circuits that have let us cut parts count and costs drastically—while improving performance in every way. Auto-answer and auto selection of 1200 bps or lower speed. Both synchronous and asynchronous. \$695*

CIRCLE 63

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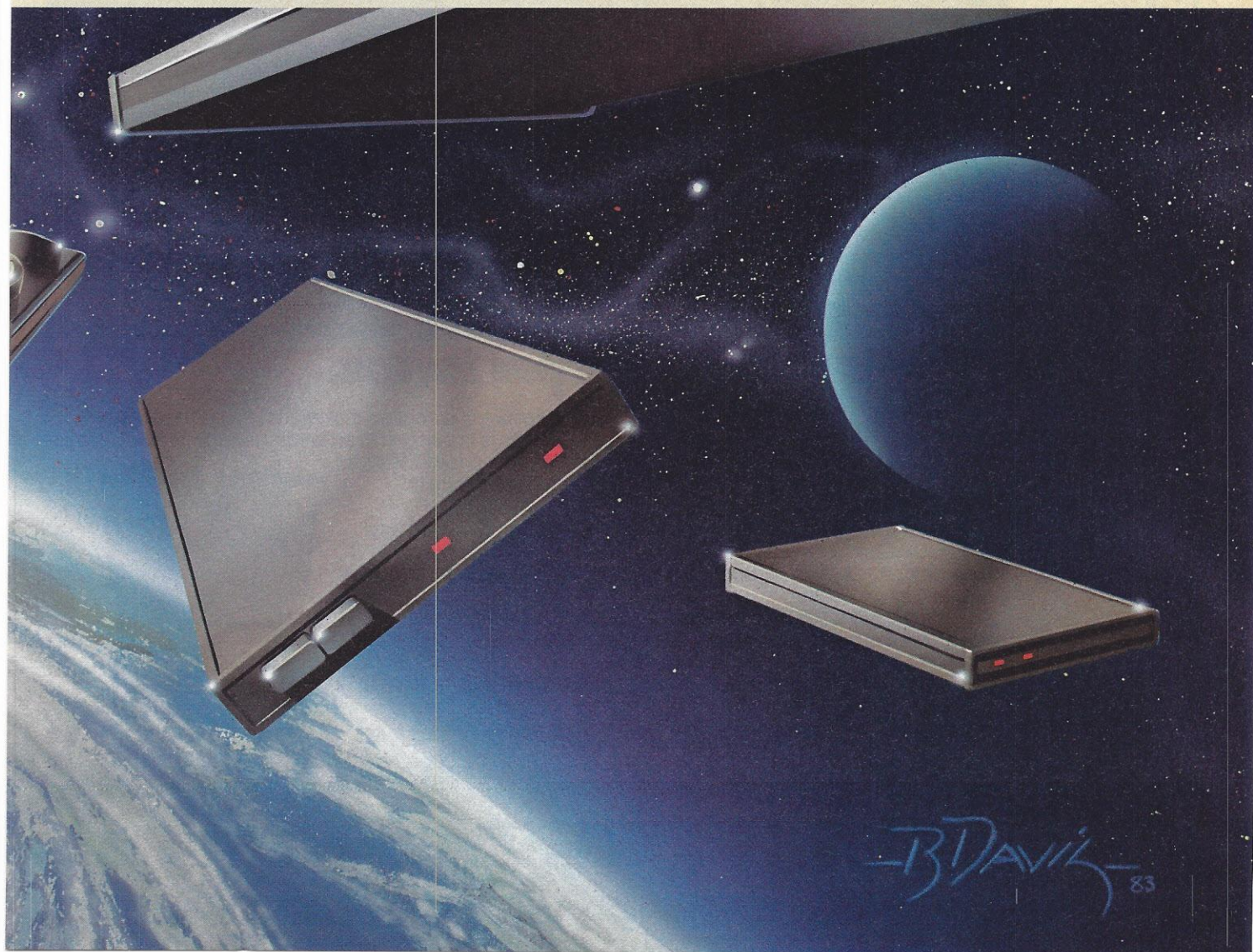
Complete communication system for Apple owners. Modular design lets you grow into—not out of—the system. Comes with excellent software—our own Com-Ware™ is a simple-to-use, menu driven terminal program. Full range of speeds up to 1200 bps. All auto functions—phone directory with auto configuration and auto dial, redial, answer, disconnect. Binary or text modes. VisiCalc™ and CP/M™ compatibility—and the list is growing. Installation can still be just one slot in your Apple II, even with optional 212 card. \$389* and up.



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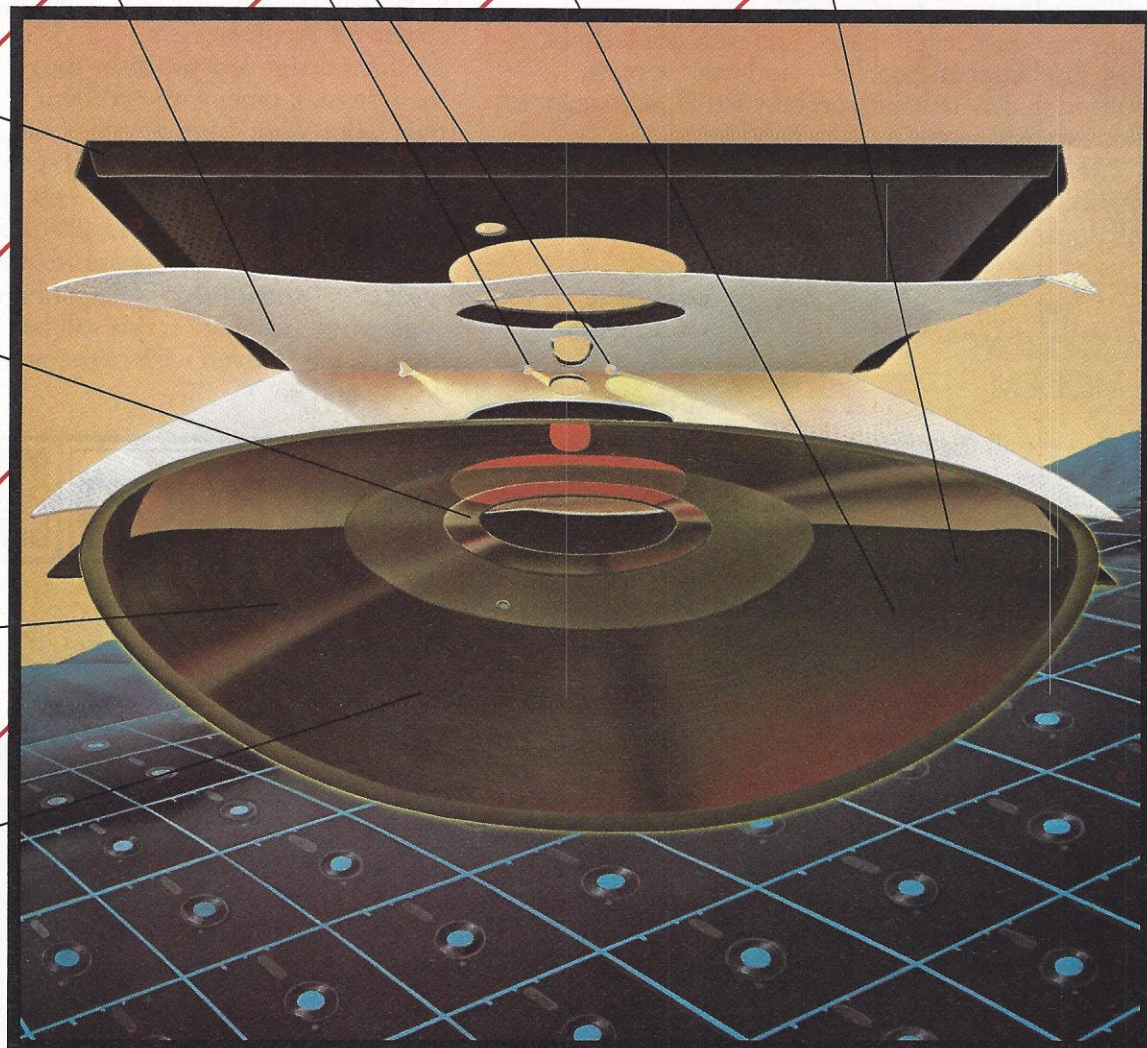
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MEMOREX

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(continued from page 229)

puter for his administrative assistant at City Hall, who receives most of his phone calls. The plan is for the assistant to type in and encode the names of people as they call with their concerns. Hongisto believes that will greatly expand his list of potential contributors and voters.

But Hongisto's interests aren't confined to San Francisco. He corresponds regularly with friends and acquaintances around the country. "I do this for both social and professional reasons," he says. "I enjoy the interchange of ideas from many different people. But it's also important to keep in contact with those who might be able to help me in my professional career."

To make sure he doesn't lose contact with anyone, Hongisto uses his word processor to remind him when a letter is due. Whenever he writes or receives a letter he enters the name of his correspondent and the date.

Hongisto's varied professional life has included jobs as a police chief and Commissioner of Correctional Services in New York. And he is not at all sure that his present position as City Supervisor will be his last. In order to be prepared for new opportunities, he keeps a resume in his program which he updates regularly. He also keeps an updated biographical sketch for local newspapers and others who might want to write about him.

But politics is only part of Hongisto's professional life—he also owns and manages a number of apartments in the San Francisco area. In this role he uses his word processor in all the obvious ways—to send personal letters to tenants telling them where to dispose of trash, or informing them of rent increases. He says this personal touch is more effective in getting action.

Hongisto has also found some innovative ways to use his computer in

managing his properties. He saves time and legal fees by typing standard legal forms such as leases into his word processor. When necessary, it takes him only a minute to generate the completed forms. And when, in the case of leases for example, certain clauses have to be changed, WordStar allows him to accomplish this in a matter of minutes.

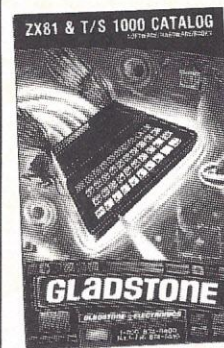
Says Hongisto, "Whenever a part of my life becomes too complicated, I figure out a way to allow my computer to help me. It may take me a while to set up a new system and input new information, but once it's done, it's done. I feel that a burden has been lifted and I suddenly have more time to take on another project."

—Lawrence Stevens



San Francisco Supervisor Richard Hongisto may use a pen to sign his name to a document but he uses his computer and WordStar to write to his constituents.

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NAME DESCRIPTION

| | | |
|----|------------|--|
| 1 | RULE78 | Interest Apportionment by Rule of the 78's |
| 2 | ANNU1 | Annuity computation program |
| 3 | DATE | Time between dates |
| 4 | DAYYEAR | Day of year a particular date falls on |
| 5 | LEASEINT | Interest rate on lease |
| 6 | BREAKEVN | Breakeven analysis |
| 7 | DEPRSL | Straightline depreciation |
| 8 | DEPRSY | Sum of the digits depreciation |
| 9 | DEPRDB | Declining balance depreciation |
| 10 | DEPRDDB | Double declining balance depreciation |
| 11 | TAXDEP | Cash flow vs. depreciation tables |
| 12 | CHECK2 | Prints NEBS checks along with daily register |
| 13 | CHECKBK1 | Checkbook maintenance program |
| 14 | MORTGAGE/A | Mortgage amortization table |
| 15 | MULTMON | Computes time needed for money to double, triple, etc. |
| 16 | SALVAGE | Determines salvage value of an investment |
| 17 | RRVARIN | Rate of return on investment with variable inflows |
| 18 | RRCONST | Rate of return on investment with constant inflows |
| 19 | EFFECT | Effective interest rate of a loan |
| 20 | FVAL | Future value of an investment (compound interest) |
| 21 | PVAL | Present value of a future amount |
| 22 | LOANPAY | Amount of payment on a loan |
| 23 | REGWITH | Equal withdrawals from investment to leave 0 over |
| 24 | SIMPDISK | Simple discount analysis |
| 25 | DATEVAL | Equivalent & nonequivalent dated values for oblig. |
| 26 | ANNUDEF | Present value of deferred annuities |
| 27 | MARKUP | % Markup analysis for items |
| 28 | SINKFUND | Sinking fund amortization program |
| 29 | BONDVAL | Value of a bond |
| 30 | DEPLETE | Depletion analysis |
| 31 | BLACKSH | Black Scholes options analysis |
| 32 | STOCVAL1 | Expected return on stock via discounts dividends |
| 33 | WARVAL | Value of a warrant |
| 34 | BONDVAL2 | Value of a bond |
| 35 | EPSEST | Estimate of future earnings per share for company |
| 36 | BETAALPH | Computes alpha and beta variables for stock |
| 37 | SHARPE1 | Portfolio selection model-i.e. what stocks to hold |
| 38 | OPTWRITE | Option writing computations |
| 39 | RTVAL | Value of a right |
| 40 | EXPVAL | Expected value analysis |
| 41 | BAYES | Bayesian decisions |
| 42 | VALPRINF | Value of perfect information |
| 43 | VALADINF | Value of additional information |
| 44 | UTILITY | Derives utility function |
| 45 | SIMPLEX | Linear programming solution by simplex method |
| 46 | TRANS | Transportation method for linear programming |
| 47 | EOQ | Economic order quantity inventory model |
| 48 | QUEUE1 | Single server queueing (waiting line) model |
| 49 | CVP | Cost-volume-profit analysis |
| 50 | CONDPFOT | Conditional profit tables |
| 51 | OPTLOSS | Opportunity loss tables |
| 52 | FQIOQ | Fixed quantity economic order quantity model |
| 53 | FQEOQSH | As above but with shortages permitted |
| 54 | FQEOQPB | As above but with quantity price breaks |
| 55 | QUEUECB | Cost-benefit waiting line analysis |
| 56 | NCFANAL | Net cash-flow analysis for simple investment |
| 57 | PROFIND | Profitability index of a project |
| 58 | CAP1 | Cap. Asset Pr. Model analysis of project |

| | | |
|-----|----------|---|
| 59 | WACC | Weighted average cost of capital |
| 60 | COMBAL | True rate on loan with compensating bal. required |
| 61 | DISCBAL | True rate on discounted loan |
| 62 | MERGANAL | Merger analysis computations |
| 63 | FINRAT | Financial ratios for a firm |
| 64 | NPV | Net present value of project |
| 65 | PRINDLAS | Laspeyres price index |
| 66 | PRINDPA | Paasche price index |
| 67 | SEASIND | Constructs seasonal quantity indices for company |
| 68 | TIMETR | Time series analysis linear trend |
| 69 | TIMEMOV | Time series analysis moving average trend |
| 70 | FUPRINF | Future price estimation with inflation |
| 71 | MAILPAC | Mailing list system |
| 72 | LETWRT | Letter writing system-links with MAILPAC |
| 73 | SORT3 | Sorts list of names |
| 74 | LABEL1 | Shipping label maker |
| 75 | LABEL2 | Name label maker |
| 76 | BUSBJD | DOE business bookkeeping system |
| 77 | TIMECLCK | Computes weeks total hours from timeclock info. |
| 78 | ACCTPAY | In memory accounts payable system-storage permitted |
| 79 | INVOICE | Generate invoice on screen and print on printer |
| 80 | INVENT2 | In memory inventory control system |
| 81 | TELDIR | Computerized telephone directory |
| 82 | TIMUSAN | Time use analysis |
| 83 | ASSIGN | Use of assignment algorithm for optimal job assign. |
| 84 | ACCTREC | In memory accounts receivable system-storage ok |
| 85 | TERMSPAY | Compares 3 methods of repayment of loans |
| 86 | PAYNET | Computes gross pay required for given net |
| 87 | SELLPR | Computes selling price for given after tax amount |
| 88 | ARBCOMP | Arbitrage computations |
| 89 | DEPRSF | Sinking fund depreciation |
| 90 | UPSZONE | Finds UPS zones from zip code |
| 91 | ENVELOPE | Types envelope including return address |
| 92 | AUTOEXP | Automobile expense analysis |
| 93 | INSFILE | Insurance policy file |
| 94 | PAYROLL2 | In memory payroll system |
| 95 | DILANAL | Dilution analysis |
| 96 | LOANAFD | Loan amount a borrower can afford |
| 97 | RENTPRCH | Purchase price for rental property |
| 98 | SALELEAS | Sale-leaseback analysis |
| 99 | RRCONVBD | Investor's rate of return on convertible bond |
| 100 | PORTVAL9 | Stock market portfolio storage-valuation program |

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Business Is Booming In Salinas

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Our billion-dollar-a-year produce industry will be shocked to learn you've declared Salinas an economic disaster zone, as will be our retailers, whose 1982 second quarter sales ranked Salinas in the top 50 in total sales among the 250 largest cities in California.

What I said, and what your writer probably tried to say pending editorial revision, was that the downtown revitalization is two-thirds completed, with only the "100 BLOCK" (not 100 blocks) of Main Street still in active restoration.

I must modestly correct the article's statement that I saved Salinas. A city which has had an annual growth rate of 3 percent for the past 20 years is hardly a candidate for economic salvation. And a city that finished among the top 16 nationally in the All-America Cities judging this year, certainly isn't in the bleak situation your article suggested.

As to the article's characterization of my company as a "hydra-headed monster," suffice to say I'm a busy man, but I can still get in a week of skiing even without a number cruncher. Our computer is a useful tool, not a miracle machine.

With MicroComputer Consultant's software, we gain efficiency but our projects are still managed by people, not the system.

Should you ever again consider an article involving Salinas, take a look at the modern, growing, and prosperous city we are, and take away your editor's dog-eared copy of the *Grapes of Wrath*.

People who write about computer technology shouldn't be living in the past.

Thank you for permitting me to set the record straight.

R. Jay DeSerpa
DESERPA ASSOCIATES
SALINAS, CA

ON WORD-PROCESSING CHART FEATURES

Being a relative newcomer to the world of personal computers, I was anxious to read your article "Word Processing: Finding the Right Software," on page 110 of the April 1983 issue. After reading the article, I scanned the charts to compare the systems' different features. I was very disappointed in the charts.

Unlike your article, in which you discussed features such as live screens, memory- and disk-based systems, 80-column requirements, and special function keys, just to mention a few of the important ones, the charts did not list these features at all. I feel these features would be major factors in the selection of a word processor for a particular computer. In addition, there were no explanations for the headings of the chart columns. For instance, in the editing features chart, there was a box with the title "Search and Replace," with a subtitle "Search Only." Don't any of the systems have the capability to replace after a search?

Your comparison charts are still useful, but they could have been improved had you included the features you discussed in the article. Another useful addition would have been the list price of each system, but then the article might have been too long.

Yes, I'm still slightly confused, but I'm better informed now than before. I would be reluctant to go to a computer store to ask for a demonstration, much less ask questions. From past experience, most sales people don't know enough to answer more detailed questions.

Lawrence Ngou
CANOGA PARK, CA

The comparison charts were compiled with the help of the companies listed. Each company claims its word processor performs a unique function, and listing all of these with explanations would fill volumes. Instead we chose the features we felt would be most helpful to the greatest number of users.

Many word processors can both search and replace. Notice that some packages do not have a bullet in the "Search Only" category, but have bullets in the sub-categories "Character Strings" or "N Times." This means these packages can search and replace character strings, and can search and replace N times.

Users who wish to obtain more information about the listed packages should consult the buyer's guide on page 112. There we listed company names, addresses, packages, the systems they run on, and prices.—The Editors

A COMMENT ON GEMS

I noticed that your Gem of Wisdom "A Penny Saved..." on page 191 of the April 1983 issue explained how to extend the life of nylon printer ribbons with stamp pad ink. I would like to point out that while this trick may work for daisywheels or similar printers, it should not be used for the dot-matrix machines.

Ribbons for matrix printers contain a special oil that lubricates the print head. Since stamp pad ink lacks this oil, the print head wears faster than normal and may even overheat, causing premature printer failure. There are no pennies saved if this happens!

I enjoy your magazine, and usually put aside whatever I'm doing to read it when

"Hayden's *Personal Computing* magazine's accuracy policy: to make diligent efforts to insure the accuracy of editorial material. To publish prompt corrections whenever inaccuracies are brought to our attention. Corrections appear in 'Letters.' To encourage our readers as responsible members of our business community to report to us misleading or fraudulent advertising. To refuse any advertisement deemed to be misleading or fraudulent."



Dear cousin:

Alas, for when you read this letter you shall know-perish the thought-that I have perished! You see, my bar-rister holds instructions to forward this letter ONLY IN THE EVENT OF MY UNFORTUNATE DEMISE!

Years ago, during my worldly travels, I chanced upon a treasure map suggesting huge wealth buried on a little-known tropic isle. Naturally, I pursued it, forthwith and to wit, fully suspecting certain unspeakable dangers inherent to the task. Unfortunately, they proved to be dangers so vile, so terrible, so incredible, that no human being should ever be forced to face. Yet, I faced this force of evil and, as you may realize upon receipt of these words, have indeed succumbed in the attempt.

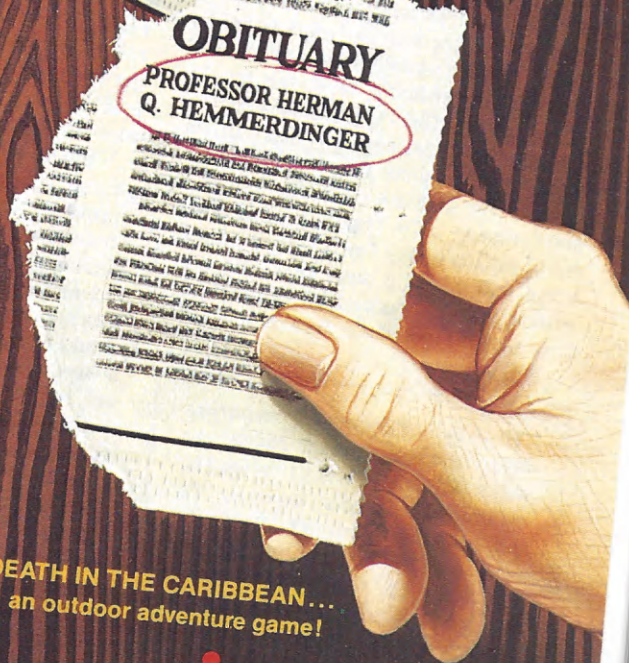
Though I may have failed, the challenge is passed along to you! So accept the torch. Go! Seek it out, to wit and forthwith. But hark, I warn you-stay alert, be ever on your guard, and beware for your very life! Because each step of the way you will face DEATH IN THE CARIBBEAN.

Your loving cousin,

Professor Herman Q. Hemmerdinger

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APPLES IN AGRICULTURE

In the book review section of your April 1983 issue, Marvin Grosswirth reviewed *Will Someone Please Tell Me What an Apple Can Do*, by Glenn Polin (page 152). Grosswirth mentioned that the author of the section entitled "The Apple in Agriculture" did not explain what the B.O.A.R.S. acronym stands for.

B.O.A.R.S.—Breeding Optimization And Record keeping System—is the trademarked name of the Swine Management Software developed by Computerized Farm Information Systems, Inc. This software is a record keeping/management tool for the pork producer. Detailed data on each boar, gilt, sow, and litter is recorded and manipulated to give reports that aid the pork producer in managing for optimal results. B.O.A.R.S., in fact, is the swine management software that has been in existence the longest, having been demonstrated recently at the American Pork Congress for the sixth consecutive year. This software has been refined over the years, and many pork producers consider it the most complete such software available.

Donald L. Lund
PRESIDENT
COMPUTERIZED FARM
INFORMATION SYSTEMS, INC.
STILLWATER, MN

COMPUTING IN THE CHURCH

I would like to correct some misinformation in your April 1983 article "A Congregational Computation," page 99.

Financing the computer hardware was achieved by combining the memorial funds of Mr. Henry Drees, uncle of Mr. and Mrs. William Hanna, and Russell Van Howling, who was a traffic manager for Asarco, Inc. before his death. Reverend Vander Kruik discussed the uses of a personal computer with the Hanna family, all of whom have a keen interest in computers. When Mrs. Hanna spoke to me about this project, I saw it as a prac-

tical use for my husband's memorial fund, as it would free our pastors for more important tasks.

The software for our computer was donated by a member of the Board of Trustees following the September 20th meeting, at which the [computer] purchase was approved.

I was happy to be a part of the computer task force, but I, like Reverend Duncan, remain a "computerphobe" rather than a "tech."

Jane Van Howling
ALLEDALE, NJ

A NEW GENERATION

I would like to debate one point in your February 1983 article "A New Generation Arrives," page 48. You discussed how the age of the "easy computer" had begun, wherein "... the machine now has been commanded to communicate on people's terms" and not vice versa as before. You cite the recent arrival of several personal computers such as the Wang Professional, Corvus Concept, Fortune, and, of course, the new LISA. I applaud these developments, and along with the Savvy machine language and the new integrated software packages, they should go a long way toward making personal computers more comprehensible and productive for us all.

You then went on to say that the testimonies of the people who worked on the easier-to-use products "... bespeak a strong respect for the personal-computer owner and how he has provided the funds and the ground rules for the current marketplace." I agree. It was the money from sales in the early years that gave these companies the capital to prosper and develop new ideas, and you are correct in recognizing this debt.

In the case of LISA, however, I feel Apple has turned its back on the very buyers who made the company a major force in the marketplace. With this high-priced machine geared for the businessman, Apple has thrown a bone to the personal-computer user with the Apple IIe, a unit based on old technology (forget the Apple III, it was a disaster), while the company's focus has obviously now switched to serve the needs of the office where "resources" (read money) are greater.

Granted, 200 man-years of development don't come cheap ("The Birth of

LISA," page 88), but it's the underlying change in attitude that disturbs me. I feel that once other computer makers hook into the SmallTalk technology of the LISA and produce units of their own, Apple may find it has sacrificed the unique and extremely valuable position it has so far enjoyed—that of providing a popular, versatile, and affordable computer for the serious user of modest means.

The marketplace is full of me-toos struggling to capture the attention of the public, although only a half-dozen companies—like Apple—have done so thus far. Now, by joining the even larger throng of desktop makers, will the future find Apple scrambling to compete? It's a \$10,000 gamble. Should the Macintosh be introduced later this year with some of LISA's capabilities—and it sells for \$5000 or less—I'll take back some of my words.

Claudia Grill
PALO ALTO, CA

MORE ON MODEMS

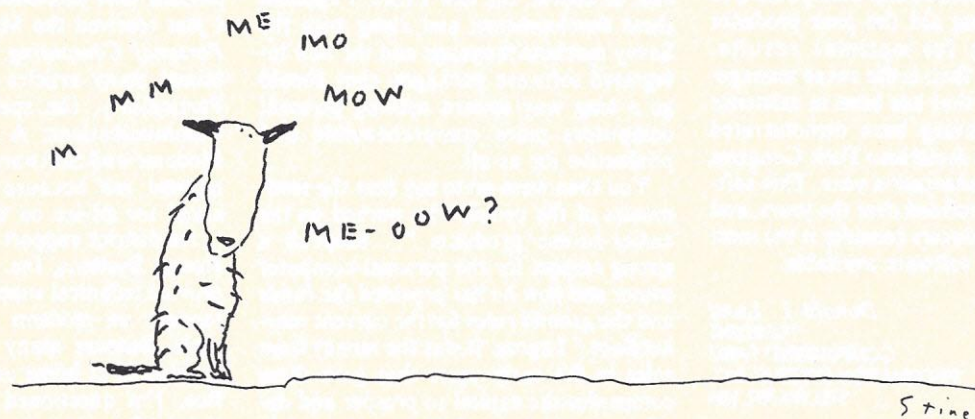
I just received the March 1983 issue of *Personal Computing*. As usual, it contained many articles of interest to me. Particularly, the special report "Data Communications: A Buyer's Guide to Modems and Software," on page 96, intrigued me because I am frequently asked for advice on this peripheral.

As district support engineer for Data Access Systems, Inc. in San Antonio, I provide technical support and field maintenance on modems and other peripherals. Because many of my clients use computers at home as well as in the office, I'm questioned frequently on all types of equipment. Your article was clear and concise, and answered the more frequent questions I have been asked.

Your mention of line noise problems is one I often have to contend with in San Antonio—the home of many Air Force and Army installations with old pulse-type phone lines. Line noise has been responsible for many "phantom" problems, and your bringing it to light is to be commended. One solution has been to install a dedicated phone line at the site of the workstation, which clears 90 percent of the problem.

Lawrence J. Sachartoff
DATA ACCESS SYSTEMS, INC.
SAN ANTONIO, TX

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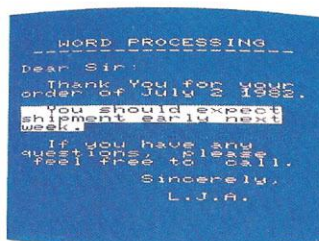
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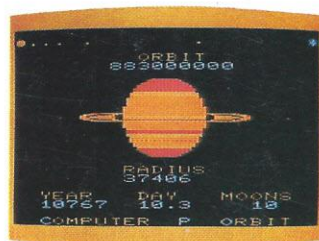
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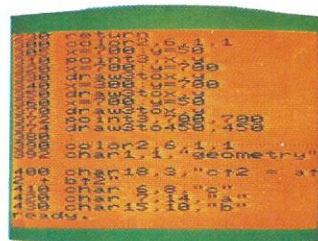
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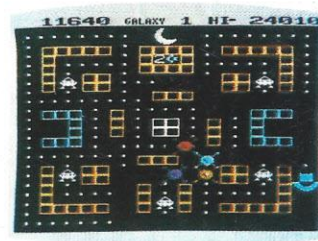
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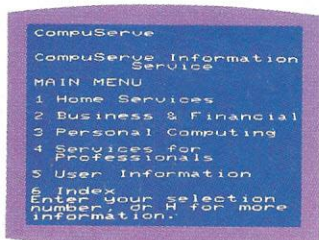


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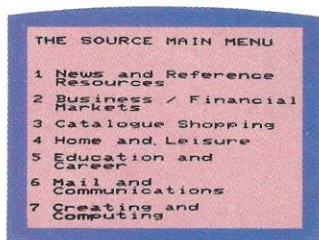


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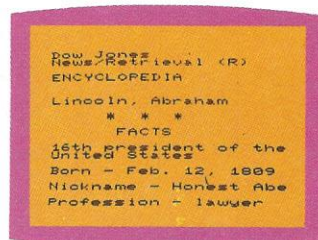
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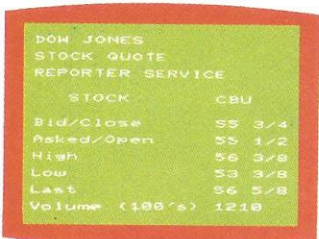
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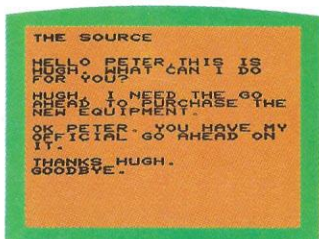
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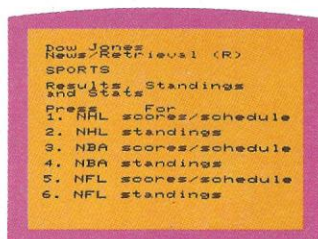
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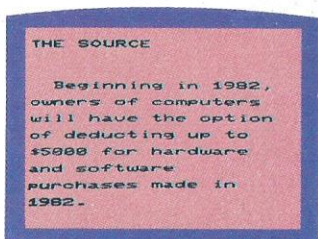
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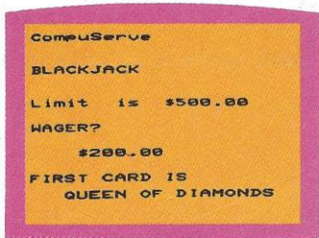
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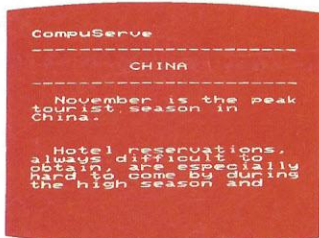
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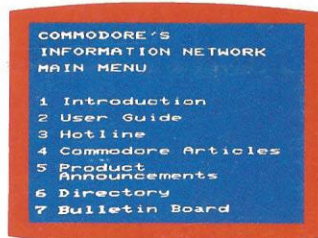
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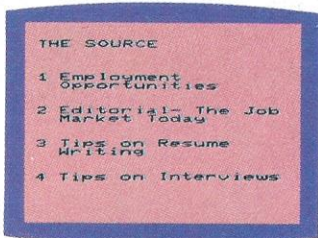
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